

The Iron Age

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A Review of the Hardware, Iron and Metal Trades.

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A New Milling Machine.

A machine tool of novel design has recently been brought out in France in the shape of a universal vertical and horizontal milling machine, built by P. Huré, of Paris. The engravings which we reproduce from *Le Génie Civil* convey a fair idea of its construction.

The principal feature of the machine will be found in the provision for different speeds of the tool spindle, two sets of speeds being available, secured in the manner shown in the detail views, Figs. 3, 4 and 5. It will be observed that each spindle pulley has connected with it an internally toothed wheel (D, in Figs. 3 and 5) gearing with two small spur-wheels, E E. These in turn gear with the pinion C (Fig. 3), which is mounted directly on the tool spindle and forms part of the driving pulley. The spindles of the wheels E E are marked G, and are carried in the plate F; H is a pawl so arranged in connection with a spring, K, that it may be

of the engine, and this cannot be diminished with metal rails, for if the engines were made lighter the grip of the driving-wheels would fail. The paper would doubtless afford a far better adhesion, and thus be less violently treated, and effect a saving in the plant. It is not a question of wear, but of crushing. When there is no slipping of driving-wheels, nothing but rolling pressure, there can be little or no wear or surface; the only doubtful question—as it appears to me—is whether the compressed paper will disintegrate internally under the action of repeated crushing strain, and thus bulge out sideways. The tenacity of paper is much greater than is commonly supposed. The prevailing ideas on the subject are due to the fact that we usually have it before us in films that are easily torn by a cross strain. A sheet of iron equally thin is similarly tearable. If we try to break a piece of paper by a fair, straight pull its great tenacity becomes evident. Count Rumford made a bar of paper by gluing strips of ordinary sheets together.

cleaning out, and will then be made available as a troopship. Her chief mission will be the transport of troops from Sebastopol to Batoum. If her preliminary trips happen to be made in some of the heavy and choppy seas, which are not unfrequently experienced in these waters, the Livadia's doubtful seagoing capacity will be somewhat severely tested, and her behavior will be watched with some interest by those naval experts and designers who approved or condemned her structural lines before she left the slips of Elder and Pearce. At all events, with moderately fair weather the Livadia will, after being cleared out and refitted, be capable of carrying in a single short voyage an enormous number of troops in case of need.

The Steam-Power of Prussia.

The number of steam engines used in a country is a fair indication of its industrial

Although some of this increase of motive-power is no doubt due to the replacement of hand labor by machine work, the extraordinary development of Prussia's manufacturing power is evident from the figures, and accounts for the persistence with which Germany endeavors to extend her export trade, the wealth of her population having, of course, not increased at the same rapid rate.

India-Rubber and Asbestos for the Protection of Ships.

Some novel experiments, instituted for the purpose of testing the value of india-rubber and asbestos as a protection to ships were recently carried out in England against the hull of the *Resistance*, which had been brought round from Devonport ready prepared for the purpose, the Admiralty having determined to use the old iron ships which have become obsolete, and which are

without any interior protection, and contiguous to this was a cell of circumscribed dimensions filled with asbestos packing. Both these devices covered the water line. As soon as everything was in readiness the hulk was cantled to starboard, so as to bring the compartments on the port side fairly out of the water. This was achieved by means of shifting 200 tons of iron ballast. The *Pincher* gunboat was moored to a buoy at a range of about 100 yards from the ship, and the fourth compartment—the one furthest from the stem—was attacked by the quick-firing gun, which has a caliber of a little over a couple of inches, and throws a shell of 6 pounds, containing a burster of $\frac{1}{2}$ pound. The sea was smooth, and, as the light was all that could be desired, the projectile hit the target with admirable precision. The *Blazer* was then made to supersede the *Pincher* and attacked No. 3 compartment with the 5-inch breech-loader, which discharges a shell weighing 50 pounds, and having a burster of 4 pounds

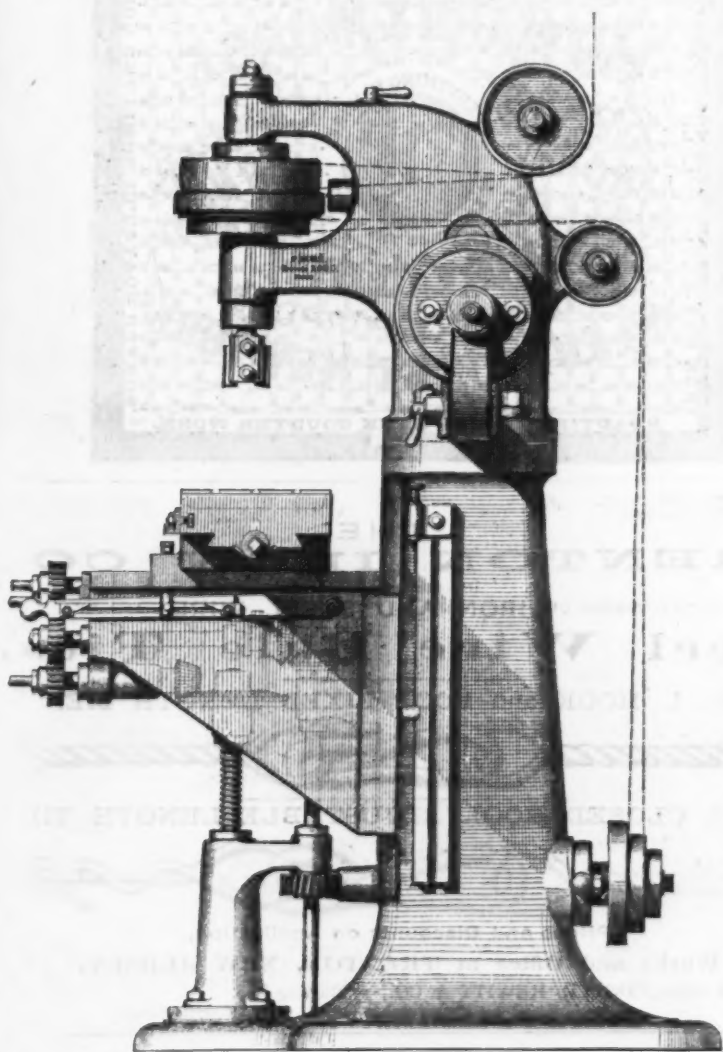


Fig. 1.—Side Elevation.

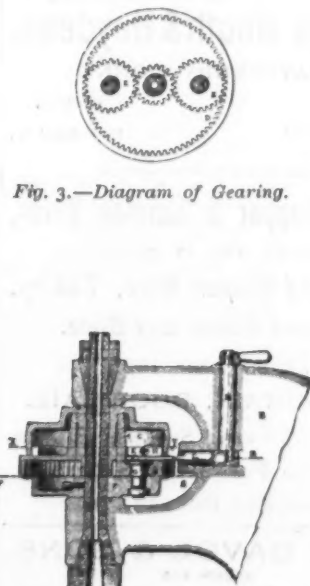


Fig. 3.—Diagram of Gearing.

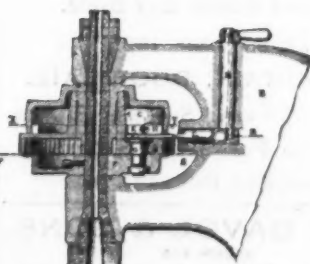


Fig. 4.—Section of Tool Spindle and Gearing.

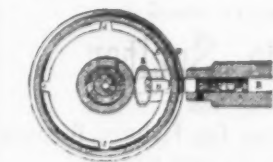


Fig. 5.—Section Along Line x y z of Fig. 4.

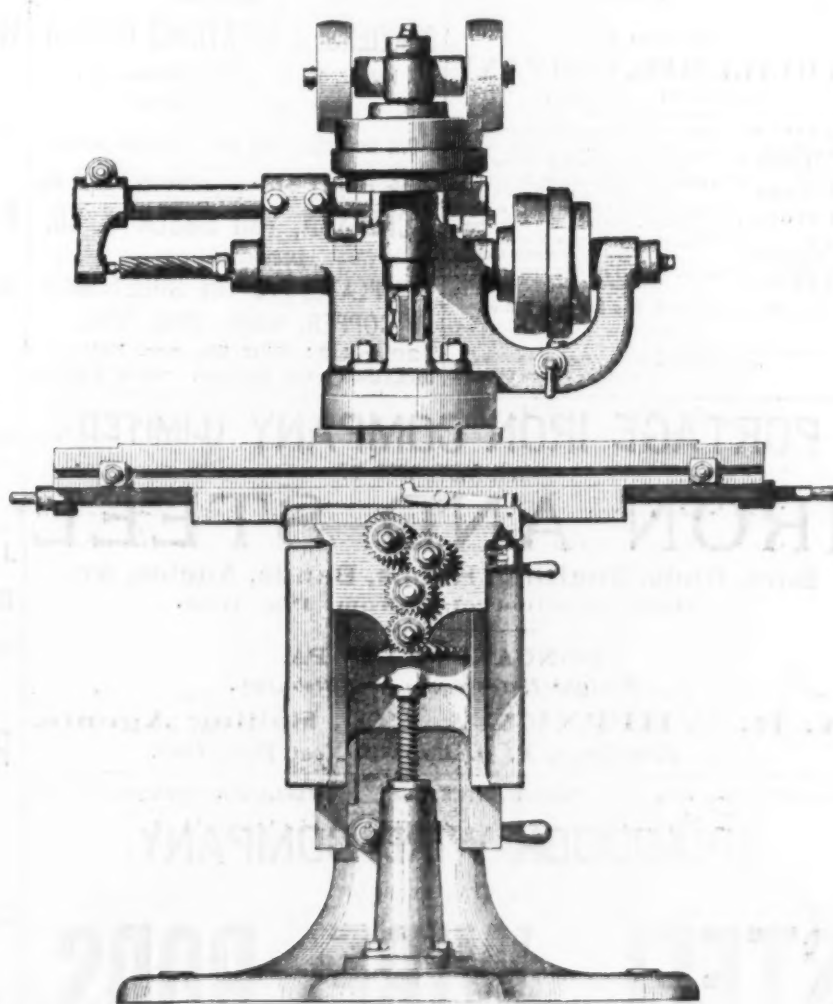


Fig. 2.—Front View.

A NEW UNIVERSAL MILLING MACHINE, BUILT BY P. HURÉ, PARIS, FRANCE.

made to catch into the wheel C at the several points J J J (Fig. 5), throwing into gear with this wheel the internally toothed wheel D. By means of the bolt L, worked by the eccentric shaft M, the pawl H may be pushed back, throwing the wheel D out of gear. In both cases, of course, a change of speed is secured. The engravings will be found to satisfactorily supplant further description. The vertical travel of the table is some what over 1 foot, the horizontal transverse travel about 0.8 foot and the longitudinal travel about $3\frac{1}{4}$ feet. The machine is entirely automatic.

Durability of Paper Rails.

With regard to the projected establishment of a manufactory near St. Petersburg for the manufacture of paper rails, Prof. Mattieu Williams, in the *Gentlemen's Magazine*, says:

We are told by the *Organe des Mines* that paper rails can be produced at one-third the cost of steel rails, and that they are extremely durable, the paper being condensed by great pressure. Being much lighter than metal these rails may be carried and laid at far less cost. They are to be made in greater lengths than ordinary rails, and therefore will have fewer joints. This will doubtless diminish oscillation and the consequent wear and tear of rolling stock. The success or failure of the project is simply a question of durability, and I doubt whether anybody can make any prediction better than mere random guessing concerning this. Many will, of course, laugh at the idea as obviously absurd, but all great innovations are obviously absurd to those who do not understand them. In reference to this we must remember that much of the wear and tear of our rails is due to the crushing weight

He found that such a bar having a sectional area of 1 square inch sustained a weight of 15 tons. This is a near approach to the tenacity of wrought iron. The Admiralty test for ship plates is 22 tons in the direction of fiber and 18 tons across for the first-class, and 20 tons and 17 tons for second-class, iron.

We must all be well-wishers for the success of this invention, as the luxury of gliding over noiseless tracks would be charming. Even our ironmasters would scarcely complain, the rail-making trade having been long since reduced to a series of transactions about as profitable as cashing one's neighbor's checks. My own view of the commercial part of the subject is that the superseding of iron and steel rails would be a national blessing. Our supplies of raw material are limited. We are rapidly exhausting our coal, and already have to largely import our ironstones. The capital now engaged in such crude work as rail-making would be far better employed in higher production. Better that the outside world should make its own rails and come to us for locomotives. An ounce of watch springs or a pound of needles is worth as much as a ton of rails, and with our excess of labor and dearth of material it is desirable that we should be forced by competition to make up value by highly elaborating small quantities of material.

It is stated that the late Russian Imperial yacht *Livadia*, upon the magnificent equipment and gorgeous embellishment of which Alexander II lavished so many millions of roubles, appears at last destined to be put to some practical use. The *Livadia* arrived at Sebastopol a few days ago from Nicolaeff. She has already been denuded of her former sumptuous appointments and decorations, but is now to undergo a further and radical

position. Although in some localities water supplies an important contribution to the motive-power, yet in the main manufactures are carried on by the aid of steam. Some figures taken from a report of the Berlin Chamber of Commerce will show the rapid increase in the number of engines and boilers that has taken place in Prussia during the period from 1879 to 1885, and will afford further evidence of the great industrial development of Germany during those years. Excluding locomotives and engines belonging to the military and naval departments, there were at the beginning of

1879.	1885.	
32,411	41,431	Stationary boilers.
29,865	38,830	Stationary engines.
5,586	8,191	Portable engines and boilers.
702	1,411	Marine boilers.
625	1,048	Marine engines.

These machines are unequally distributed in the different provinces. Confining ourselves to the stationary engines we find in East Prussia 693; West Prussia, 1089; Berlin district, 1254; Brandenburg, 2773; Pomerania, 1282; Posen, 983; Silesia, 5524; Saxony, 4838; Schleswig-Holstein, 1063; Hanover, 2333; Westphalia, 5789; Hesse-Nassau, 1187; Rhineland Prussia, 10,008; Hohenzollern, 12. The number of engines corresponds, of course, to the extent of manufacturing industry in the different parts. The power of 38,802 out of 38,830 engines has been ascertained, the total amounting to 1,221,854 effective horse-power. In 1879 the ascertained power of 29,171 engines was 887,870 horse-power, so that the number of engines has increased by 31 per cent, and the steam-power by 37.6 per cent. The greatest number of engines had between 5 and 20 horse-power; then came those of 5 horse-power and under, followed by the larger sizes above 20 horse-power, the number decreasing with the increase of the power of the separate engines.

of no value to sell, as targets for armor tests. It is considered that they will afford better evidence of the resisting qualities of ship plates than has hitherto been obtained. The *Resistance*, which is to be tested first by guns and subsequently by torpedoes, is an armor-plated ship of 6273 tons displacement, was launched in April, 1861, and her total cost was £258,120. In length she measured 280 feet, and in beam 54 feet 2 inches, with a draft of 26 feet 10 inches. She is protected for 148 feet of her length with armor $4\frac{1}{4}$ inches thick, backed by 18 inches of teak, fitted outside the iron hull. The object of the experiments last week was to test the merits of india-rubber and asbestos fiber as a means of plugging shot holes, as it is of transcendent importance to ascertain the effect of shell fire below deck, and also the efficacy of any means that can be suggested for arresting or minimizing the inflow of water after the penetration of a ship's sides. The use of india-rubber lining was first proposed, we believe, by Captain Fitzgerald, and the *Resistance* was fitted for the trial under his own direction. Four compartments were built in the bows on the port side of the water line on the water-tight flat immediately below the lower deck, and consequently in wake of the skin of the hull, which is $\frac{1}{2}$ inch thick. These compartments were 4 feet deep, 5 feet broad and varying from 10 feet to 13 feet in length, and were formed by carrying an iron screen $\frac{1}{2}$ inch in thickness across the athwart-ship bulkheads of the ship, thereby forming a sort of improvised longitudinal bulkhead. The inner side of this bulkhead was coated with india-rubber of different thicknesses, two of the compartments being lined with $\frac{1}{2}$ -inch sheets and the others with 1-inch and $1\frac{1}{2}$ -inch sheets respectively. On the starboard bow a patch of rubber 1 inch in thickness was placed on the exterior skin of the ship

12 ounces. The charge was equal to 16 pounds. After this round an examination was made on board to ascertain the extent of the mischief which had been inflicted below. India-rubber is in its nature a very perishable commodity, and, even had it fulfilled the end desired, it would be objectionable for this reason, but it lamentably failed in the primary object. The rounds from both the light and the heavier shell guns not only pierced the bulkhead 5 feet from the side, as they were expected and intended to do, but, as was also feared, they had shattered the rubber coating and cut it into strips. Against shot rubber has been known to succeed in closing up the well-defined perforations, but shell fire is quite another matter, and as it failed with iron as a backing its behavior upon steel, which more easily splinters, may be readily conjectured. The gun to be employed against compartments Nos. 1 and 2 was to be determined after the effect of the first 2 rounds had been discovered. The results of the firing upon the other compartments were much about the same. The small shells of a rapid-firing gun, which was next tried, appeared to hit where they could do the most harm, and the damage wrought by them was found to be even greater than by more powerful weapons. Men were sent to plug up the wounds by means of the usual plugs and oak stoppers. The *Resistance* having again been made tolerably water-tight, she was cantled over to bring the rubber patch and the asbestos cell out of the water. They then were afterward attacked in their turn by the 6-pounder, three rounds being fired against the former and one against the latter. The results in these cases were considerably more satisfactory, as projectiles passed through the rubber intact. Two of the perforations when looked through on the inside exhibited no defined hole, but a series of radial cracks or cuts, while the aperture made by the third shot had

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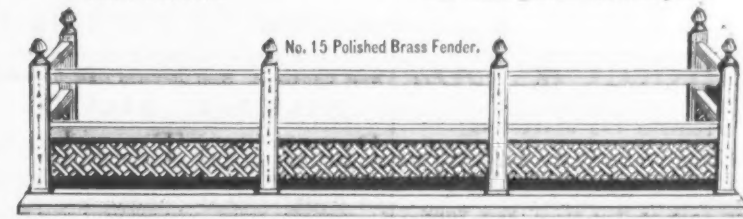


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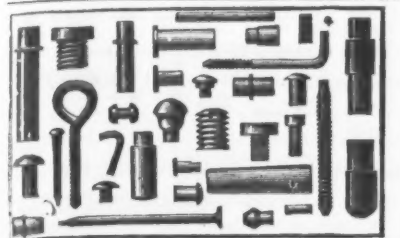
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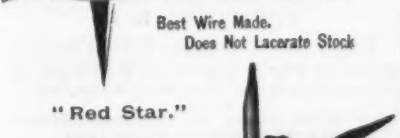
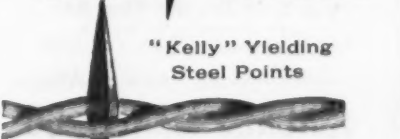
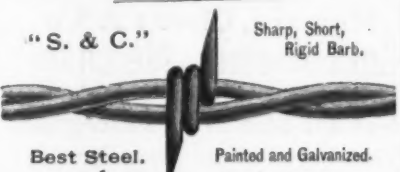


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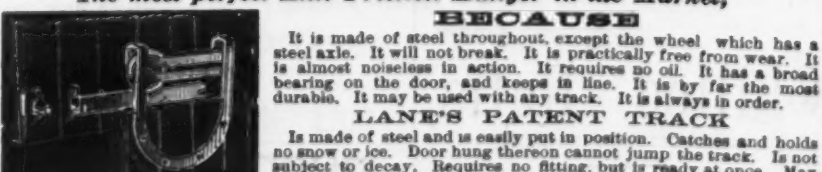
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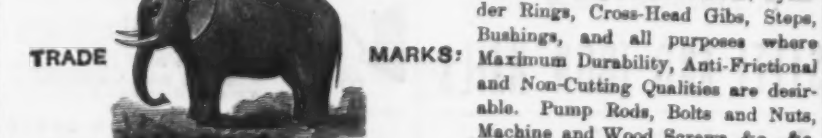
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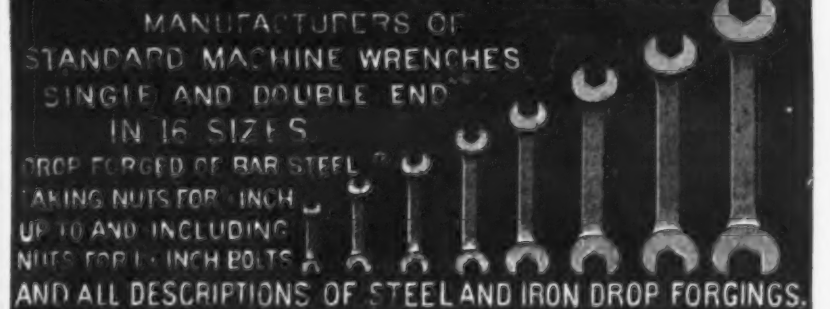
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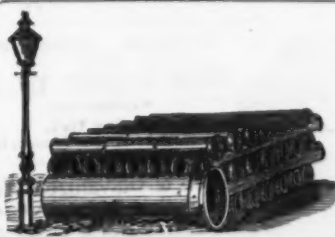
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completely closed, though not so completely as to perfectly keep out the sea. The asbestos, on the other hand, had completely answered its purpose, not, as was supposed, by swelling or through any elastic property, but by a change of substance, having been converted into a sort of paste or putty by means of absorption. When the ship was heeled over, and the cell was brought under water, it appeared thoroughly to do the work that was intended. The Resistance was then towed into harbor to be prepared for an assault by torpedoes in the region of her armor protection, it being intended to test her to the death.

English Letter.

(From Our Regular Correspondent.)
LONDON, September 6, 1886.

THE SITUATION
is by no means better or clearer than it was when I last wrote to you—indeed, in some respects it is rather more involved than it was at that time. Politically the news from the Balkan States is most disquieting, and has been made the more so by the intelligence received to-day that the Prince of Bulgaria has decided to abdicate, after all. People are not so much concerned in that event *per se* as in what it portends. The sinister activity of Russia is held to mean that other and more important events are on the cards; consequently there is everywhere that unrest and suspicion which are engendered by the unknown. It is feared that the Czar is determined to reopen the Eastern question with the intention to wipe Turkey out of the map of Europe, and under the impression that by so doing he will not be in any way hindered by Bismarck, while the resulting inevitable squabble about Egypt will set by the ears England and France in a manner eminently calculated to prevent either of those powers from taking any active part in the real combat. This political embroglio is very naturally most prejudicial to trade and commerce. It is causing the limitation of all business with Turkey, the Balkan States, the Levant and Asia Minor; consequently it is a thorough damper upon the spirits of those who had begun to entertain sanguine hopes of the recovery of trade. We who are influenced by these considerations cannot avoid envying you Americans who live free from these worries and miserable ambitions.

During the week we have had a further spell of very hot weather, but within the past few days there has been a break, accompanied by heavy thunder storms, rains and waterspouts. These storms have done considerable damage to the crops, but I believe that in a large majority of instances the wheat, oats and barley had been safely and securely garnered before the weather broke. As to the yield, I refer readers to my estimate of a week or two ago, to which opinions I still adhere.

In the North of England there is not unlikely to be some trouble with the ironworkers on the question of wages. The employers have given notice of a reduction, and to this the men demur on the plea that their wages are already sufficiently low—so low, indeed, that many of them are alleged to be unable to earn a satisfactory livelihood. The puddlers are receiving 6/3 $\frac{1}{2}$ ton, whereas it is contended by the masters that the proper elongation of the sliding scale would bring that rate down to 5/, to be in proportion with the selling price of bars. What may be the upshot of the dispute yet remains to be seen. It is worth noting, however, that the leaders of the workmen have recommended the men to accept a reduction provided the masters are also able to secure reductions in royalties on minerals and in railway rates. This proviso is a very curious one, inasmuch as it asks the ironmasters to do what they would be very pleased to do had they the power. As a matter of course they would only be too pleased to have these lower rates, but, if they have to make the drop in wages contingent upon them, it is but reasonable to suppose that the ironworkers will enjoy their current rates of remuneration for a long time to come. In Scotland the resolute manner in which the coal miners are restricting the output of coal is causing some inconvenience and is leading to a much more equal balance between the production and consumption of fuel. In some cases the prices have been raised, while in others early advances are spoken of as being certain. The action of the miners in this is certainly novel, and so far has been effective.

The adoption of restriction in the Cleveland district is causing the discharge of some hundreds of ironstone miners thereabouts. This was to have been expected, and the movement must spread as the restriction is better enforced. There are still doubts expressed as to the *bona fides* of the Cleveland combination, but, so far as I can learn, all the scheduled arrangements are being carried out as faithfully and rapidly as is possible under the circumstances. It is a "stern chase," however, and such chases are proverbially long ones. Many months must elapse before any adequate impression is made on the reserve stocks.

THE IRON MARKET
has been far from buoyant during the week, and on the whole disappointing. The Cleveland restriction commenced on September 1, but it is felt that so much has to be done and the time must necessarily be so far ahead before benefit can accrue therefrom that practically the market must be left to its merits pure and simple. Difficulties with the workmen and the miners have been threatened in Cleveland, while in Scotland there is a possibility of affairs being brought to a crisis by the restriction pursued by the miners. Moreover, with such unsettling elements operating upon the market both holders and buyers seem reluctant to complete transactions beyond what are necessary for immediate requirements. At Glasgow the warrant market has steadily declined since my last report, although at closing business was done at 39/5. At Middleboro' the prices quoted about 10 days ago on the strength of the

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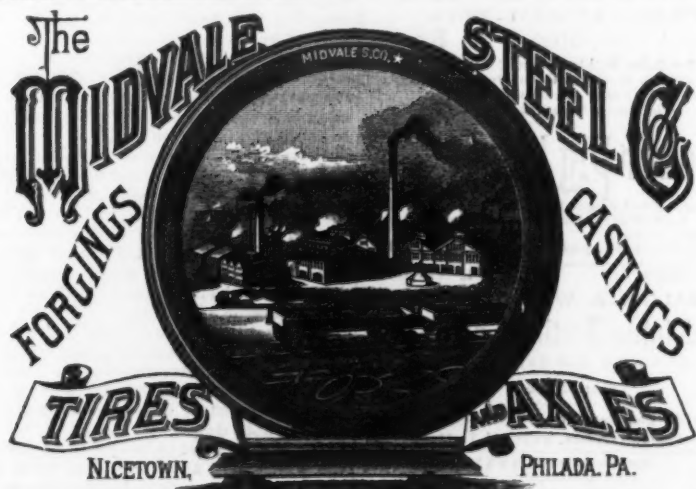
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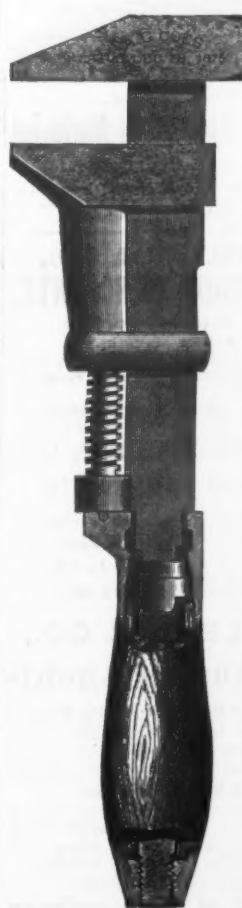
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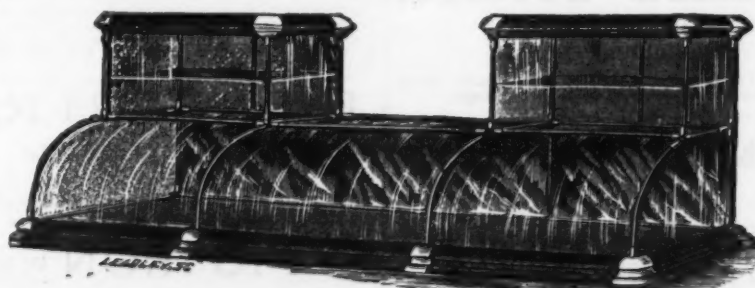
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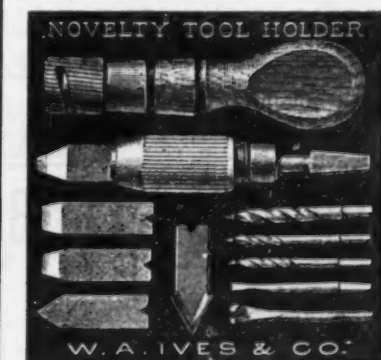
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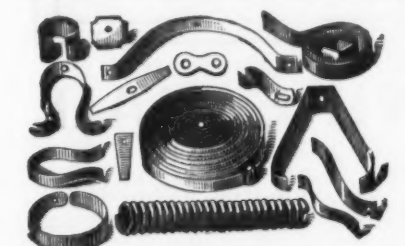
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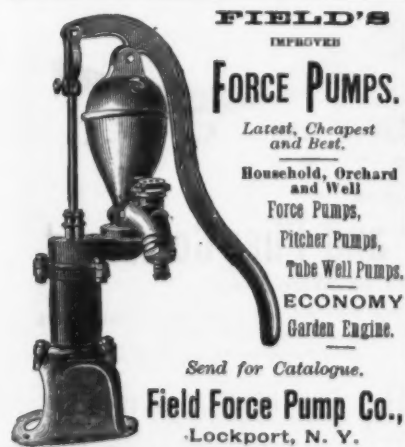
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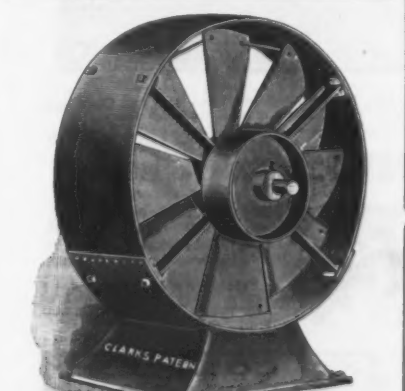
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Fig. 120.



Fig. 209.



Fig. 70.

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restriction have given way. In short, those prices were never realized, and although nominally 29/9 @ 30/ are now mentioned, lots have changed hands below those figures. A rather better feeling has prevailed on the West Coast, but is not sufficiently marked to create any new feature. Mixed lots are still quoted at 41/6 @ 42/ in Lincolnshire there are rumors of a desire for restriction, and a furnace has been blown out within the last few days, but nothing further has been done in the matter. Staffordshire continues in the inanimate condition it has manifested for so long. The little move that was made in the galvanized-iron trade has died away, and the situation is held to be more unsatisfactory than ever. The finished departments, too, show no sign of improvement, but rather the contrary, specifications being more and more difficult to secure, almost at any price, yet it is well enough known that there is plenty of work that must sooner or later come forward. In Cleveland merchant bars are quoted at £4. 10/ less 2 1/2 %. Best bars, £5, and best best, £6, both less 2 1/2 %. Iron ship plates, £4. 7/6, less 2 1/2 %. In Staffordshire late rates for all kinds of finished work rule. Scrap is quiet at former prices. Freight for pig iron by ordinary steamer from Glasgow to New York remain steady at 5/ 3/4 ton; from Liverpool to New York for tin plates they stand at 4/ and primage. Steel, taken all round, continues to be fairly brisk, and much inquiry is still made for billets and blooms for the United States. So far, however, the business done has been small compared with the inquiries. Steel rails are quiet. Rumors are abundant as to what is about to be done and what has been done, but nothing reliable can be gathered from the best sources that would justify mention of any of them. It is generally believed, however, that in a few weeks at most some long-looked for developments may benefit the market. Prices vary for standard sections from £3. 12/6 to £3. 15/ and in a few instances a little more money has been obtained.

SCOTCH PIG IRON

is a little better than it was at the beginning of last week, but is still not very strong. There are 82 furnaces (64 on ordinary pig) in blast as compared with 89 a year ago. In Connaught the Glasgow stores there are 815,937 tons of pig, against 618,995 tons this date last year—an increase of 407 tons last week. Shipments to date are 260,230 tons, 40,771 tons less than to the same date last year, while the importations of Middlesboro' pig into Scotland have been 217,144 tons, or 31,453 tons in arrears. Current quotations are:

Deliverable alongside.	No. 1.	No. 2.
Gartsherrie, at Glasgow.....	43/	41/
Coltness, ".....	47/	42/6
Langloan, ".....	43/	41/
Summerlee, ".....	45/	41/
Clyde, ".....	45/	41/
Monkland, ".....	40/6	39/
Govan, at Broomielaw.....	40/6	39/6
Shotts, at Leith.....	40/6	39/6
Carron at Grangemouth.....	40/6	39/6
Glenarnock, at Ardrossan.....	42/	39/6
Eglington, ".....	39/6	38/
Dalmellington, ".....	40/6	38/

MIDDLESBORO' PIG IRON

is still quiet, and prices are a little more uncertain than they ought to be under the circumstances. For G. M. B., f.o.b. at makers' wharves in the Tees, quotations are:

No. 1 Foundry.....	33/3	Mottled	28/9
" 2 ".....	32/3	White	28/3
" 3 ".....	30/3	Refined metal	46/-
" 4 ".....	29/9	Kentledge	33/6
" 4 Forge.....	29/3	Cinder	27/6

HEMATITE PIG IRON

remains steady, with good shipments and a fairly strong demand. Prices are as under:

No. 1	No. 2.	No. 3.
Lonsdale.....	42/	41/6
Workington.....	41/6	41/6
West Cumberland.....	42/	41/6
Lowther.....	42/	41/6
Distington.....	42/	41/6
Solway.....	42/	41/6
Maryport.....	42/	41/6
Harrington.....	42/6	41/6

Reserve stocks are 109,961 tons in the stores only. There are 40 furnaces at work in the district. Shipments to date have been 377,934 tons, or 50,984 tons ahead of last year. Rail shipments are 213,060 tons, or 17,082 tons in advance of last year's figures.

BLAST-FURNACE RETURNS.

The monthly returns of the Ironmonger (London) give the following results on September 1:

Total number of furnaces	
Existing August 28, 1886.....	269
In blast August 28, 1886.....	275
Out of blast August 28, 1886.....	494
In course of erection August 28, 1886.....	6
On ordinary pig iron of various districts.....	280
On hematite pigs (about).....	84
On spiegelisen.....	11
On basic (about).....	8

The figures relating to the number of furnaces at work show a steady decrease, there having been 391 operative on August 1. As compared with a year ago the number has fallen off by about 100, so that the process of depletion is going on slowly but very effectively indeed.

TIN PLATES.

In London these commodities are in a very little better position than they were at the time of our last report. It would appear from the important reduction in the price of Bessemer plates that the makers of coke plates have henceforth to fight very keenly for existence. During the week a fair number of orders has been placed, but there is no improvement in values. On the contrary, we can now quote ordinary IC cokes 12/6, and Bessemer cokes 12/9, f.o.b. Liverpool. In Liverpool there has been a considerable increase in the amount of business done in tin plates, but the prices are very low. There are so many coke tins and Bessemer steel cokes of good brands offering at 12/9 IC, f.o.b. Liverpool, with no buyers that it is impossible for them to remain firm even at that for any length of time. Many of the ordinary run of brands are selling at 12/6 IC. The bulk of the business has been done in the sort of plates already mentioned. Some buyers have been placing their orders rather freely. The next in importance have been Siemens steel plates with coke finish,

a few orders for which have been placed at 13/6 IC. Now the coke tin and steel wasters are down to 12/. As a general rule there has been a little more doing in these, several orders having been booked this week. In charcoal tins there has been but little done; in fact, sales of these have been limited for a long time past now. The recent downward turn of affairs has been a heavy blow to the tins-plate business; 11/6 @ 12/6 IC are the prices now at which good and very suitable brands are to be had in abundance, and 13/ @ 13/6 will secure many of the choice brands.

THE HARDWARE TRADES.

In London retail trade is, of course, at this time of year passing through a period of inactivity. The influx of visitors into London from the colonies and America, and of working people from the provinces, helps to mitigate the quietude, but only to a certain extent, the latter, as will be readily understood, only contributing to the sales of the cheaper class of fancy articles. Electroplate, cutlery, domestic tools and general hardware are alike in quiet demand in London. The country trade, especially on the South Coast, is reported well up to the average. At Birmingham business shows little signs of improvement in this district, though on the whole there seems to be rather more doing than there was a week ago. Those firms who make winter goods are beginning to receive orders with more freedom, and hopes are entertained of the next three months being busy ones. The sporting season has led to the local gun makers being better employed than for some time past, but those firms who only make military weapons are not busier than they were three months ago. Bedsteads of medium quality are being exported in tolerably large quantities to Australasia, New Zealand being perhaps the best market. Makers of anvils are rather better employed, and the Redditch needle trade is reported to be in a more healthy condition. At Sheffield there is no doubt that a better tone exists generally, though it may perhaps be due more to the recent big orders for armor plates and the good lines which have fallen to some firms. Nevertheless, there is a better inquiry all round for heavy castings for railway material, such as springs, tires and axles, for saws, files and tools of all descriptions. The United States have sent better orders of late, and from the colonies, Australia in particular, a few orders have come in which offer encouragement after the prolonged depression. Much more reasonable is it to found anticipations of future improvement on such news as I hear from South Africa. There is every prospect that this important market, which has for years past been practically dead, is about to witness a revival. A more settled order of things, social and political, is encouraging enterprise and fostering investment.

Steel Springs.—A circular dated September 10, issued by the A. French Spring Company, Limited, says: "Owing to the growing disposition on the part of consumers to procure material of all kinds at lower prices, manufacturers have been compelled to look for cheaper grades of material. In view of this fact, we have decided to manufacture springs from two qualities of steel. While we have always used and advocated crucible cast steel in the manufacture of railway locomotive and car springs, and experience proves that in the end it is the most durable, and hence the most economical, some railroad companies, however, have adopted an analytical, as well as a physical, standard of their own, for the guidance of manufacturers, and which permits the use of steel manufactured in bulk, and therefore much cheaper than that quality of steel known as crucible. These railroad companies ask no guarantee, and assume the responsibility of the springs giving good service, insisting only that the springs pass the physical and analytical tests to which they are subjected at the time they are furnished. But, as a comparison of value, it may be stated that crucible cast-steel springs are now in service and in good condition that have been in constant use for over 16 years to our knowledge. It is our aim now, as ever, to produce the best and most serviceable springs at a fair and reasonable price. We shall use the highest quality of crucible cast steel, as heretofore, and the best grade of special steel; and our patrons can always depend upon obtaining from us just what they order, and the best of its kind, leaving it optional with them as to what quality they desire to use. The difference in the cost of the springs will only be the difference in the cost of the material used, as our method of manufacture will be exactly the same in both cases. We shall use nothing but the best quality of crucible cast steel in the manufacture of our locomotive springs."

A correspondent of the London Globe writes: "One of the largest firms in the United States is busily engaged in carrying out a large contract for the military authorities at St. Petersburg for metal sheeting, the cost of which will amount to nearly £1,000,000. It is stated that the contract has been sent across the Atlantic simply to test if it can be executed in a way equal to the work supplied by English contractors." With reference to the above the Sheffield Telegraph says: "A local manufacturer who knows the main facts favors us with some information. He is able to confirm from his own private knowledge the general accuracy of the statement that large Russian orders for cartridge metal are being placed in America; but there is no question of testing the quality of the American work, since there are establishments in the United States engaged in this branch of the trade which cannot be matched either in England or in Germany. No doubt European manufacturers could supply everything that the Russian Government requires in this way, but when the Czar is making rapid and extensive preparations for war, as he now is, he naturally places such evidence of it as cannot be concealed where the fact is least likely to be advertised to those who may be his antagonists."

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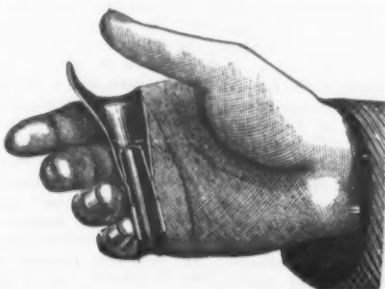
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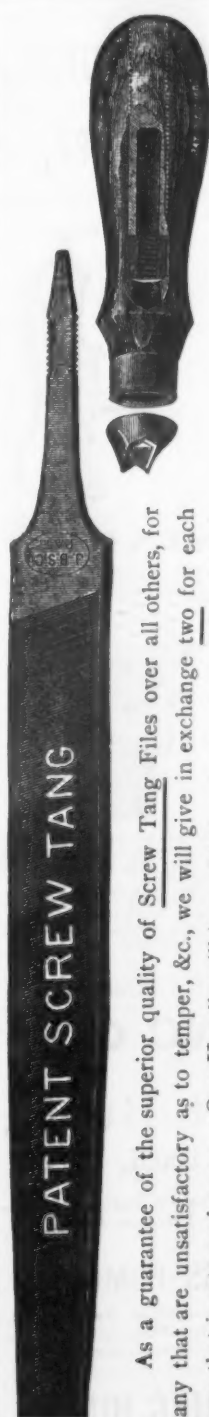
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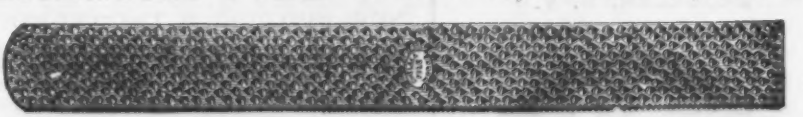
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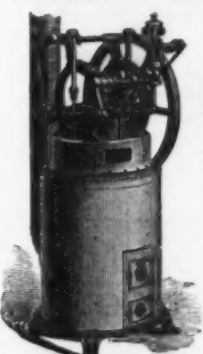
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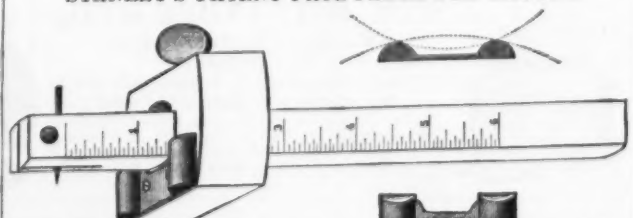
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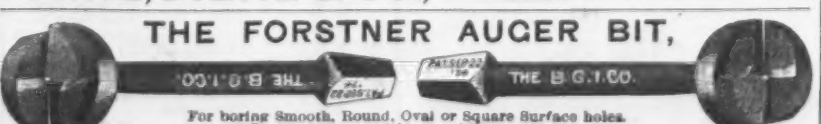
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NEW PUBLICATIONS.

OUR NEW ALASKA, OR THE SEWARD PURCHASE VIN-
DICATION. By Charles Hallock. Illustrated from
sketches by Prof. T. J. Richardson, New York.
Forest & Stormes Publishing Company.

Mr. Charles Hallock is a graceful and
picturesque writer of extensive experience
as a traveler and observer, and in this little
book he has given us more useful and inter-
esting information about Alaska than can be
found in any other volume with which we
are acquainted. He has undertaken to
show that Alaska is a valuable territorial
acquisition by reason of natural resources,
and that a visit thither is repaid by observa-
tion of the physical phenomena of the terri-
tory, concerning which so little is really
known. He assumes—and not without reason,
as one who reads his pages will con-
clude—that Alaska has been misconceived,
maligned and misrepresented. He assures us
that it is richly fertile, and altogether a
most charming place for summer explora-
tion and pleasure travel.

The author has endeavored to combine
entertainment with a didactic purpose, and
has succeeded. He describes his journey
from Portland, Ore., to Juneau, in a very
pleasant way, with some good suggestions to
carriers and travelers. He then passes to
the consideration of the economic value of
the country, and describes its resources in a
way well calculated to excite surprise. His
descriptions of the natives and their ways of
living are interesting and instructive. From
his chapter on mineral resources we quote
as follows:

"I suppose that mining in Alaska is much
like mining anywhere else; processes are
similar and familiar. The most interesting
part of the business is that it is an estab-
lished fact. The mines and the miners are
there, and while the incredulous are ques-
tioning even their existence, the industrious
and hopeful are busily engaged in taking out
the gold. There is no doubt that in the
early days of discovery and prospecting
there was more swindling to the square inch
than in any other known location, but
swindling was made easy because the 'stuff'
was there, the indications were there, and
pay dirt and bonanza quartz were there.
Officers of the army and navy who were on
the station were the principal investors and
chief sufferers, because nobody else had any
ready cash. These confiding and intelligent
gentlemen, who were on the spot and took
the pains to examine for themselves, making
interminable trips through the wilderness
to visit quartz ledges and placer diggings,
eagerly 'blew in' all they could spare each
pay day on the faith of their own investiga-
tions. I know one officer who has no less
than \$2500 so placed, and I believe it is
well invested, inasmuch as it is judiciously
distributed. Want of capital and mechan-
ical appliances have made investments un-
remunerative, but not worthless. As soon
as ever capital was forthcoming the mines
were developed with profits more than re-
munerative. The largest stamp mill in the
world has now been in active operation
there for nearly a year. It is located on
Douglas Island, opposite Juneau, and carries
120 stamps, working the whole year round.
It is owned by San Francisco parties. The
ore comes right out of the side of the moun-
tain (which rises abruptly from the ocean),
and is shot down an inclined plane to the
stamp mill, where it is treated; and vessels
drawing 20 feet of water can lie right along-
side the rocks of the natural shore and re-
ceive their freight not a hundred yards from
the mill. The primitive forest clothes the
slopes of the mountain from base to summit,
and fuel is all around in intimate proximity.
No plant of such value was ever erected or
operated at so cheap a cost. It is said the
outlay was \$500,000, and that \$16,000,000
have been refused for the property. It is a
low grade ore, yielding \$5 to \$100 per ton
of quartz. No stock is for sale. The first
gold brick came out in July, 1885, and
weighed 297 ounces. In August the output
was equal to \$60,000, and the mill is now
reported to be running up to \$100,000 a
month, with improving prospects. It is said
that Senator Jones, of Nevada, who is one
of its principal stockholders, is adding
\$250,000 a year to his income from its out-
put. Right alongside of this mine, in con-
tinuation of the same ledge or formation, is
the Treadwell claim, also owned largely by
San Francisco parties, which is found
equally rich in ore. Its shares are at a very
high premium, although the mine is not de-
veloped. This year machinery will proba-
bly be set up by its owners on a scale equal
to the Douglas plant. Other new and val-
uable discoveries have been made on Douglas
Island the past winter. At Willoughby
Island in Cross Sound, at the North Star
ledge near Juneau, and Kilisnoo, there are
said to be rich deposits of ore, and many
shares have been put on the market. These
insulated properties so far pan out the best."
"On the main land, just across the chan-
nel from Douglas Island, and 6 miles back
from the shore, in the heart of the moun-
tains, is Silver Bow Basin, where there are
stores, blacksmith shops, boarding-houses
and tenements for a large community en-
gaged in placer mining, who turn out
\$20,000 bulion every month from May to
October. The estimated yield for 1884 is
\$120,000. I am not aware that it was
greater for 1885. The altitude of the basin,
which is just above timber line, is so high
that the winters are very long. The lower
mountains, however, are ordinarily clear
enough of snow for prospecting in April.
Here are scores of sluices, expensive viad-
ucts and hydraulic apparatus, or 'rasters,'
hose, pans, and iron conduits 10 inches in
diameter, in place all over the basin and
up the sides of the inclosing mountains to
the very snow line. Several tunnels have
been driven into the quartz ledges which
yield a fair supply of gold. Claims have
been staked out everywhere. Lead of the
richest kind is found in big nuggets as well
as gold. I have myself broken open large
chunks of quartz which seemed to promise
nothing, and been surprised at the richness
of their revelations.

"An arastra is a queer, cheap machine
for treating ore, which can be used to great
advantage when the quartz is decomposed
and soft. It is a sort of circular tub 20 feet
in diameter and 4 feet high, with a hard
stone floor and an upright shaft in the cen-
ter which carries four arms, like a clothes
dryer. At the ends of these arms heavy
flat blocks of stone are attached by chains,
and as the arms swing around they drag
the stones over the bottom of the tub and
pulverize the quartz which is fed into it
with a due proportion of quicksilver and
such chemicals as the nature of the ore may
require. The machine is driven by a simple
water-wheel attached to the same shaft; a
sluice placed a few inches above the floor
lets off the waste water, the precious metal
uniting with the quicksilver and settling to
the bottom of the tub. There are two of
these contrivances in the Silver Bow Basin.
These mines have made Juneau quite the
center of business in Southeastern Alaska."

"About 60 miles from Juneau is the
Chilkat country, which Captain Beardslee
succeeded in opening to miners in 1880
through the instrumentality of a prominent
chief named 'Sitka Jack,' whom he sent
into the interior as plenipotentiary, arrayed
in all the self-sufficiency and authority of a
blue frockcoat, brass buttons, a colonel's
stripes, a navy cap with gold band and
device, and, I believe, a sword. He remained
all winter, dispensing good cheer liberally
from village to village, and when he re-
turned in the spring the up country natives
said it was 'all right; the white people
might come;' whereupon in 1881 a schooner
immediately outfitted at Sitka to start for
Chilkat. Jack lives at Sitka in one of the
best houses in the 'ranch,' white-painted,
with windows, green blinds, porch and ver-
anda, and it is said he is worth \$10,000. He
is industrious and shrewd, and, besides
working in the canneries, picks up a good
deal of money in 'little odd jobs.' One
summer he made \$300 in the cannery
alone. From Lynn Channel and Chilkat
Inlet, 120 miles northeast of Sitka, there are
four passes over the mountains to a chain of
lakes 150 miles long, which form the head
waters of the Yukon, the best of which
passes—25 miles in length—was selected
by Lieutenant Schwatka for his exploring
tour, already referred to in this volume.
Valuable mineral discoveries have been
made on the banks of the river, and I have
reliable information that one miner has
staked out a claim on a vein of gold-bearing
quartz 600 feet wide. In his report Lieut-
enant Schwatka says:

"The d'Abbadie, a tributary river of the
Upper Yukon, is important in an economical
sense, as marking the point at which gold
in placer deposits commences. From here
on nearly to the mouth or mouths of the
great Yukon, a panful of dirt taken from
almost any bar or bank with any discretion
will give several 'colors,' in miners' par-
lance. This gold has been ground out of the
far-away mountains by the rasping glaciers,
and deposited with the gray glacier mud
which is brought down by the streams from
the ice fields. It is probable that all the
environment of the mountains which in-
close the great central plateau of the Yukon
is rich in minerals. Schwatka mentions
having discovered a party of American
miners already at work on the Stewart
River, where they had found good prospects,
and since the spring of 1886 opened several
hundred miners and prospectors have found
their way across the Chilkat trail to the dig-
gings, which seem to grow richer the more
they are developed."

"The mines about Sitka, valuable and
innumerable as they are, have remained
unproductive until the present year, but now
the richest gold claims yet discovered are
being systematically developed by a com-
pany competent in all respects, who were
incorporated in November, 1885, under the
laws of Wisconsin. They are called the
Lake Mountain Mining Company, and their
president is C. A. Swineford, brother of the
present Governor of Alaska. B. K. Bowles,
of Baraboo, is secretary, and M. C. Clarke,
cashier of the First National Bank of Mad-
ison, is treasurer. Nicholas Haley, the old
pioneer prospector of Alaska, is a large
stockholder. The company have abundant
capital, and began work early last February
with all requisite tools for engineering,
mining, assaying, &c. In May they had
begun working the placers, and had erected
wharves and warehouses at the head of Sil-
ver Bay, some 4 miles distant from Sitka, on
Baranoff Island. They had also driven a
tunnel into the quartz ledge, with a view to
the early erection of a stamp-mill, to be op-
erated at the earliest day possible. The
property of the company comprises several
of the most valuable of the Haley claims,
from one of which this indefatigable miner
obtained an ounce of gold daily for a long
period by simply crushing the decomposed
quartz in a mortar, treating it with mer-
cury. These claims are respectively known
as the 'Lucky Chance,' 'Porphyry,' 'Cleve-
land' and 'Nickel' lodes, and the 'Haley &
Sons Placer.' Official assays of specimens of
quartz taken at random therefrom show
from \$147.60 to \$1840 per ton."

"Captain Beardslee, U. S. N., who was
on the Alaska station during the years
1870-82, has given a complete history of
mining operations in the vicinity of Sitka
during the Russian occupation and up to
the year 1880. Its publication was com-
menced in the *Forest and Stream* in 1879,
while I was its editor, and continued
throughout the year following."

"It seems that reports of mineral
and marble discoveries were long ago brought
in from time to time by the Indian fur
hunters, but very little attention was paid
to them until the year 1855, when the
Russian Government sent an engineer
officer to examine and investigate into the
mineral resources of the country. Although
he was ostensibly engaged in this duty for
a period of two years, the report is current
that he put in the best part of the time at
Sitka in 'potlatch' and dancing; and as he
never visited the range of mountains on
which are situated nearly all the ledges
which have since been discovered his report
was unfavorable, and from that date until
the transfer of the territory to the United
States nothing was done. In fact, the
Russians were after fur, not gold. The fur
company itself was especially lukewarm
toward prospectors and explorers, because,
by the terms of their contract the Govern-
ment had a right to take away from them
the control of any lands in which mineral
deposits were found."

"The first discovery of gold in the vi-

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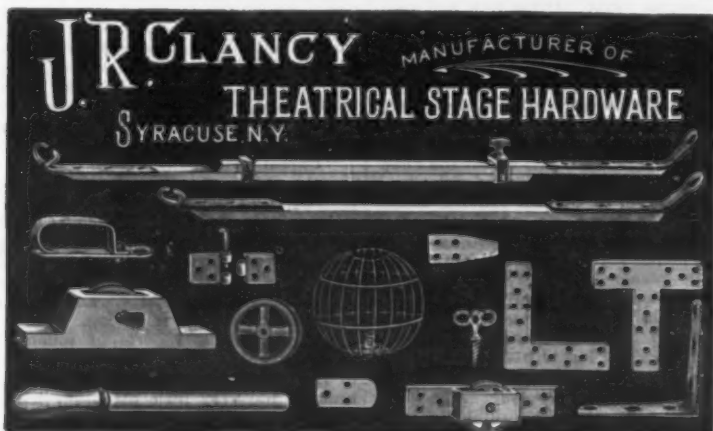
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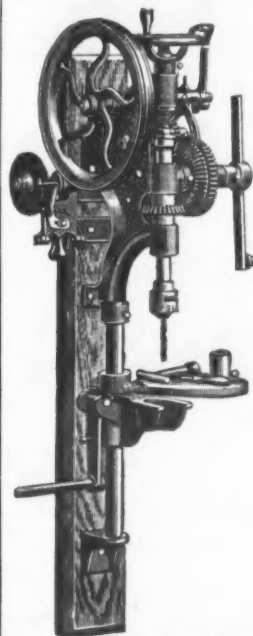
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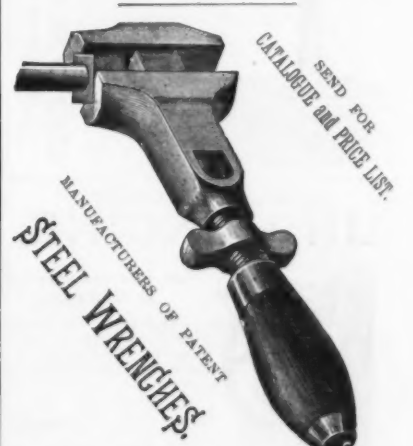


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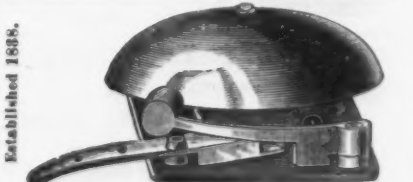
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city of Sitka was made by a soldier named Doyle, in 1871. In 1872 stringers of quartz were found at Indian River, 1 mile from town, and in the mountains back of Silver Bay, 10 miles from town, and the 'Haley & Millett Ledge,' the 'Bear Ledge' and the 'Upper Ledge' successively came to light. On December 9 of that year the first blast ever made in Alaska quartz was exploded, and from the rock thrown out and broken up by it about \$60 worth of free gold was obtained. On Christmas day the 'Stewart Ledge' was discovered. The next year, in 1873, two mining companies were formed of army officers and citizens of Sitka. In 1877 the 'Lower Ledge' passed into the hands of San Francisco people, who organized the Baronoff Island Gold and Silver Mining Company. This company watered the stock so that outsiders declined to invest, although a shaft which is down 60 feet is in good ore all the way. In 1876 the Stewart passed into the hands of Portland men, under the name of the Alaska Gold and Mining Company. This mine has been mismanaged. Nevertheless it possesses a steam 10-stamp mill, shops, cabins and full outfit. A tunnel is in over 100 feet, in good ore all the way. Another 100 feet above it is in 84 feet, and another was about being started in the month of February, 1880, at which date the output of 11 days' work was about \$1800 worth of bullion, with over 14 pounds of amalgam produced from free gold alone, ready for shipment. These statements I gathered from Captain Beardslee's report of 1880, and I am not aware that anything has been done in that vicinity since then. Other ledges discovered at sundry times on the same range are known as the 'Haley & Francis,' 'Wicket Fall' and 'Great Eastern,' and there are more still further East. Assays of the 'Great Eastern' by Selby & Co., of San Francisco, yielded \$175 gold and \$5.20 silver per ton in 1879. These specimens came from the surface, and showed no free gold whatever. Haley claims are found all over the country, one of which is said to have yielded him \$20,000 in five years' arastra work; but there are lots of 'holes' said to be valuable which are utterly worthless, and always were. In the enumeration of mining enterprises I should add that the Mexican Gold and Silver Mining Company and the Admiralty Gold and Silver Mining Company, each with \$10,000,000 capital stock, and each with J. D. Fry, T. J. Hay, James Treadwell and C. F. Stone as directors, were recently organized at San Francisco, the former for the development of valuable claims in the great gold belt of Douglas Island, the latter for ledges on Admiralty Island. These companies are preparing to get to work this summer.

"Time was, in the days of the Frazer River gold fever, when miners fitted out at Wrangell and followed up the Stickeen River, through a defile of the Alaska Mountains into the British territory beyond, where the diggings were. Wrangell had a population of 3000 people then, and could not accommodate them all. So, when the houses were filled, old hulks of vessels were converted into hotels and lodgings, and these still remain high and dry on the shelving shore, but gradually falling to decay, like a majority of the houses in this at present almost deserted town. Perhaps in some not distant day the mines will once more pan out rich, and general business revive, though, of course, there is a quantity of quartz holes scattered all over the country which are, in the native vernacular, 'kultus' (no good). To conclude: Alaska is a fascinating country for prospectors. One can find there a 'show' of everything he wants—gold, silver, iron, copper, coal, marble, and great red garnets as big as hickory nuts, but the results do not always realize the promise, and the reason presumably is a lack of capital necessary to develop them. Marble crops out all over the country through which the coastwise steamer regularly passes. Alex. Choquette, of Wrangell, has some very fine specimens of mottled white and blue marble from a quarry quite convenient to tide-water; a good quality of white marble is found on Lynn Canal. Valuable coal discoveries have been made near Kilisnoo, and Mr. C. C. Bartlett, a leading merchant of Port Townsend, Wash. Ter., has found excellent coal on Admiralty Island. Captain Nichols, of the United States steamer Pinta, claims to have found a valuable mine of bituminous coal. There is no discouragement in the outlook. Time will prove it. After the mineral discoveries at Vermillion Lake, in Minnesota, it took 20 years to convince people that the ore would pay for working, but when a certain iron company found nerve to quietly undertake the business it cleared up 63,000 tons the first year, and 226,000 the next. All that is needed in Alaska is capital.

"Coal mining is an industry which in nine years has undergone a wonderful development in British Columbia. Coal has been found widely distributed over the mainland and islands on Vancouver and Queen Charlotte Islands well to the north, at which last-named place the only vein of anthracite yet discovered on the Pacific Coast has been found. As the geological structure of Alaska is similar to that of the country adjacent, why may not like deposits exist in each? The gold mines of Alaska are far richer than those of Cariboo and Cassiar, in British Columbia, of which the output of Douglas Island is a full assurance. At present the mining laws are satisfactory. Captain Beardslee speaks with high approval of the good behavior of the miners of Alaska, even in the idle days of winter. 'They not only conducted themselves in the most respectable manner, but have given their willing co-operation in carrying out such simple laws as we have found it advisable to establish from time to time.' This testimony applied to the days before there was any civil government. I certainly found the Silver Bow miners a most orderly community, among whom no stronger beverage was current than the wholesome beer of the country, manufactured at Juneau."

Mr. Hallock gives an interesting account of the commercial fisheries, glacier fields, seal industry and other matters of interest and importance. The work is entertaining and valuable throughout; but we regret that

it is not "more" fully and attractively illustrated, and that the paper and printing are not better calculated to please the connoisseur in such matters.

A MANUAL OF LITHOLOGY. By Edward H. Williams, Jr., professor of mining, engineering and geology, Lehigh University, South Bethlehem, Pa. New York, John Wiley & Co., 1886.

With the object of meeting the requirements of those studying lithology at Lehigh University, Professor Williams has written a little work on the rudiments of that science, which will be found to possess some usefulness. Based as it is upon a classification by microscopic peculiarities of the rocks, it can only cover the ground in a somewhat crude manner, since the most accomplished lithologist will be frequently placed in a position when he must suspend judgment until the microscope has told its story. With such limitations to fetter him, Professor Williams has succeeded well. We cannot help objecting, however, to such statements as this, page 53: "Greisen is of common occurrence in Saxony and Cornwall, and accompanies tin ore." In reality tin ore is occasionally found in greisen. We believe it to be a sweeping assertion, too, to state that when hypersthene occurs with magnetite the latter is generally titaniferous.

Chemical Fire Engines.

Speaking of chemical fire engines at the recent Pittsfield (Mass.) State convention of firemen, Capt. E. F. Martin said that in extinguishing fires with a chemical engine the principal advantage lies in being able to do so with little water damage. The efficiency of chemical engines depends a great deal on the good judgment of the person or persons who have the management of them, as well as the officer who has command at the fire where they are called into action. Every one of these machines located within a city limit should have four permanently employed men to manage them, and these men should strive to qualify themselves to the service required. The method of carrying the hose to be used on these engines differs with many, some preferring a "basket," while others a reel. It is seldom that over three lengths of hose (150 feet) are required to reach the fire, and if this amount is placed double upon a reel, with connections to engine and pipe attached, you are obliged to remove but 75 feet before you have the full complement. By this method is avoided the kinking and twisting of the hose, which cannot help being the case when it is laid in a basket or placed single on a reel. Captain Martin recommends the use of rubber-lined cotton hose, because it is lighter and less liable to kink and twist while under pressure. These machines can be arranged so as to throw a large stream, and in his opinion to be the equal of a steam fire engine for from six to eight minutes. To obtain this result they should be furnished with an independent outlet and gate attachment, with free waterway, and suitable connections for 1½-inch or 1¼-inch hose. To this should be attached a ½-inch or ¾-inch shut-off nozzle. The engines should be double tanks of 75 gallons capacity. Chemical engines have demonstrated their usefulness in no uncertain terms in combating with oil fires. A stream from one of these machines through a ¼-inch nozzle will do more execution than one from an inch nozzle of a steam fire engine in this special line. They are the best of guardians in tenement-house districts. They can be used to a great advantage in buildings adjoining the one on fire, especially where there is machinery with open belt-holes. Statistics of fire insurance show that the fire losses of the country are increasing every year, averaging, as they do, from \$85,000,000 to \$100,000,000 a year. This great leak can in a great degree be checked by the introduction of the most improved fire apparatus, among which are the chemical engines.

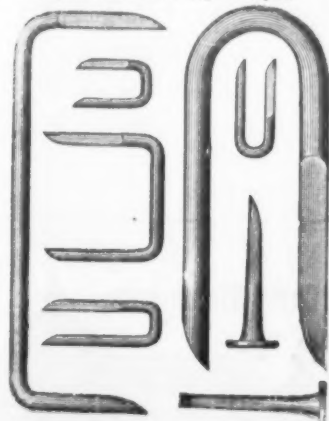
Nautical Schoolships.—"The importance of establishing schoolships," remarks the *Marine Journal*, "for the education of the young men of the United States who may desire to follow the sea for a livelihood cannot be overestimated. There has been no time in our history or the memory of the oldest citizen that American seamen have been so scarce—they are almost extinct. The few there are prefer fishing and coasting vessels for the reason that they get better pay and treatment, and it is from this class alone we would have to draw in case seamen were needed to man the naval vessels of the United States. Now that there is a prospect of quite an increase to our naval fleet there should be some movement made to largely increase the number of American seamen, and this can only be done by locating schoolships at all the important seaports and offering something more than ordinary inducements for boys to become sailors. There are enough old war vessels that are fit for no other purpose to furnish the ports of Portland, Boston, Philadelphia, Baltimore, Norfolk, Charleston, Savannah, Pensacola, New Orleans and Galveston with schoolships, and the necessary steps should be taken by the leading citizens of the above-named ports to present this important matter to Congress at its next session. It would seem that no argument would need to accompany a proper bill to carry out this purpose."

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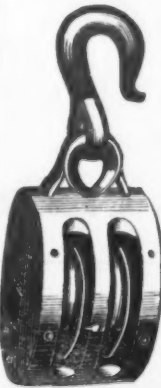
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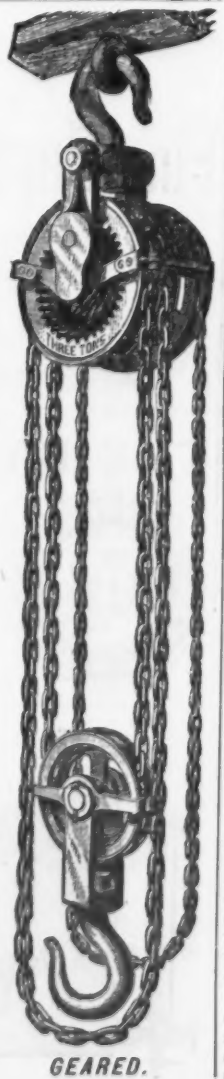
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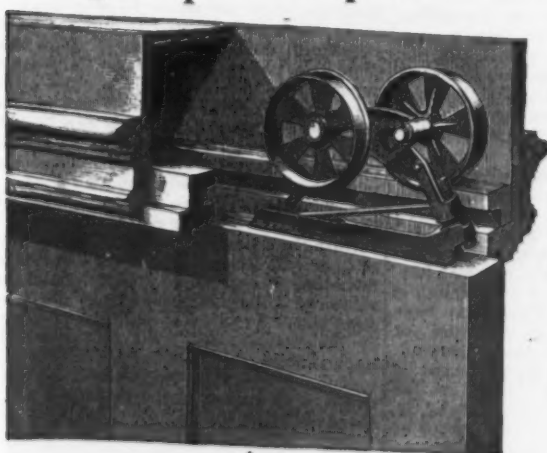
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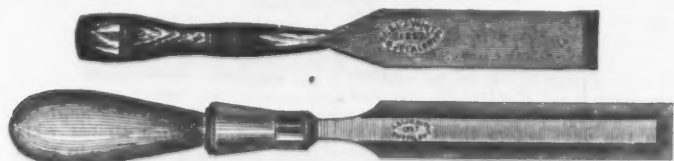
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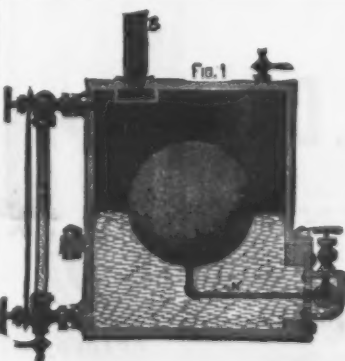
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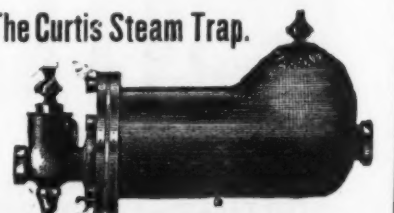
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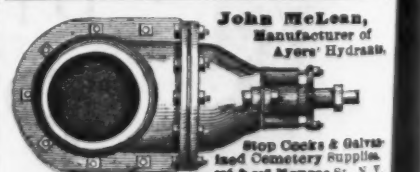
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Responsibility in Manufacturing.

An important railway, says the *Railway Review*, recently received some locomotives from a leading firm of manufacturers that were practically useless because of flagrantly careless workmanship. The inspector of the railway stationed at the locomotive works had passed upon and accepted the engines. The question of legal responsibility might therefore be somewhat seriously complicated if the matter had been pushed closely to the line from both sides. But as to the moral responsibility there can be, of course, but one decision. And it is passing strange that any reputable firm, especially of the standing which a leading locomotive firm naturally occupies, should allow such work to issue from its shops. The matter will be made right, of course, but in these times of growing prosperity, of all others, the excuse for poor work is hard to find. In the hard times of recently passed months cheap car-wheels were turned out in large numbers. But the example should be doubly unworthy of emulation in other lines of railway supplies in these days of better times. The instance of which we speak was, we are sure from the information that we have, one of carelessness rather than purpose. We speak of it only to introduce an inquiry as to the real need of relying upon inspectors to insure good quality in railway purchases. Why should it be necessary to have an inspector at a seller's shop? Why should not a contract with a reputable firm be left with that firm safely? Should it be necessary for the buyer to have an inspector watching every process in the manufacture of a rail or a car or a locomotive? Have we no commercial honor left among the manufacturers who supply the equipment of our railways? Or do our railways so selfishly and foolishly beat down prices that manufacturers cannot supply honestly-made goods at the prices forced upon them?

Novel Bells.

There is always risk of failure in casting large bells; uncertainty whether the bell will be sound when cast, and liability to eventual fracture. The transportation of such heavy weights as bells of large dimensions in their destination, and the hanging of them when there, are always matters for serious consideration. It will be remembered what preparations were made and precautions taken for the transport of the great bell to St. Paul's, and the difficulty of its hoisting and hanging; and now, being hung, it would be dangerous to swing its enormous weight—some 18 tons. It is of interest to note, therefore, that in England a bell has been invented which is claimed to obviate all these difficulties. This bell as we find it described, is not cast, but made of metal, bent or spun to shape. A bell may be made in several pieces and hard-soldered together. The peculiarity of the result, is that the bells give an astonishing volume of sound. A bell weighing but 3½ pounds gives quite as much sound as a cast bell of ten times the weight, and the tone is very pure and true. The vibrations last 25 seconds, and the overtones or harmonics are quite perceptible. The inventor guarantees to produce a bell weighing 1 ton which shall be as musical and as efficient as an ordinary bell of 20 tons. Various attempts have been made to use sheet metal for bells, but they have all failed hitherto; and the reason why the inventor has attained an unprecedented success seems to be that he has hit on a peculiar alloy, which appears to possess some remarkable properties. It is well known that ordinary bell metal is hard and brittle. In the present case, however, a method has been discovered by which a bell metal is produced which will be resonant in a very high degree, but admits of being bent. It bears, that is to say, about the same relation to ordinary bell metal that malleable cast iron bears to ordinary cast iron. Although the inventor, a Mr. Hoffman, of London, is confident that he can produce very large bells in this way, he has not made any, and it remains to be seen how far he will be successful; but he has done enough already to excite the interest and claim the attention of every campanologist.

TRADE PUBLICATIONS.

Testing Machines.
Riehl Bros., of Philadelphia, the well-known builders of testing machinery, have sent us two catalogues showing the various forms of testing machines which they have brought out in past years. The larger of the two embraces 56 pages and measures about 11½ x 9 inches. It is of a descriptive character and is fully illustrated. The smaller catalogue is more in the nature of an illustrated price list and will prove of undoubted interest and value to the trade. It covers 44 pages and treats more particularly of the smaller forms of machines.

Steam Heating Boilers.
The Victor Heating Boilers, of Norwich, Conn., have sent us a neat catalogue devoted to the interests of what is known as the Victor heater, a boiler for low-pressure steam heating, especially adapted for heating dwelling-houses, stores, offices, greenhouses, &c. The catalogue embraces 24 pages and is fully illustrated with engravings representing sections and elevations of the heater. Full descriptive particulars are also given.

Wood-Working Machinery.
Messrs. C. B. Rogers & Co., of Norwich, Conn., have issued a new catalogue devoted to the interests of their wood working machines. In this catalogue they have retained only such of their older machines as have by continued service demonstrated their value, and have introduced a large line of entirely new designs brought out during the past year. The catalogue covers 66 pages, and is profusely illustrated, illustrations and descriptive matter alike bearing evidence of careful attention. Among the machinery shown we note a flooring machine, planers and matchers, surface planers, hand planers,

molding machines, sash machines, galling, mortising and boring machines and a large line of others.

The McCosh Iron and Steel Company, Burlington, Iowa.

The McCosh Iron and Steel Company have recently issued a catalogue giving details as to the assortment of goods which they manufacture and which they represent. Among them are bar iron, Norway and Swedish iron, Thistle brand steel, agricultural steels, steel-wire nails, rivets, nuts and washers, bolts, turn-buckles, chains and a long line of wrought wagon hardware. There is also a series of malleable iron, chiefly for carriage purposes. McCosh & Co. represent the Hawkeye Steel Bar Fence Company, and have for sale also a number of handsome patterns of wrought-iron fence pickets. We note among some of the other specialties carriage and buggy tops, wrought scrapers and wagon jacks.

Boiler Furnaces.

A circular just sent us by the Bridgeport Boiler Works, of Bridgeport, Conn., illustrates the Lowe boiler furnace for horizontal tubular boilers. This furnace has been designed to prevent smoke and secure economy in fuel, and its general arrangement will be easily understood from the engraving which is given. Descriptive matter is also added.

Ide High-Speed Engines.

Messrs. A. L. Ide & Son, of Springfield, Ill., builders of the well-known Ide engines, have just issued a new and enlarged edition of their engine catalogue. It embraces 44 pages, and contains a large number of new cuts and particulars. General and detail views are given as in the old catalogue, together with valve diagrams, indicator cards, &c. Space is given also to illustrations and short descriptions of the Ide feed water heater and purifier and the Ide steam pump.

Roller Bearings.

A very interesting catalogue just issued by the Chaplin Mfg. Company, of Bridgeport, Conn., the well known manufacturers of what are known as the Chaplin roller bearings, supplies information concerning these bearings, which, as some of our readers undoubtedly know, can be and have been extensively applied to machinery. The catalogue in question shows them applied to cars, buggies and road wagons in general, roller skates, bicycles, tackle blocks, sheaves, &c., illustrations being furnished in almost every instance which very readily explain the method of application.

Asbestos-Packed Cocks.

The Pratt & Cady Company, of Hartford, Conn., have issued a catalogue of their various forms of asbestos-packed cocks for steam, water, ammonia, gas, oil, &c. These cocks have been before the public for a number of years, during which time they have been found to yield very satisfactory results. The catalogue covers 24 pages, and is profusely illustrated with engravings showing the different uses to which the company apply asbestos packing, and in nearly every case descriptions are given which will aid the reader in forming an idea of the nature of the device. Extensive price lists and tables of dimensions are added.

Water-Wheel Governors.

The Hartford Governor Company, of Hartford, Conn., have sent out a small catalogue in which they illustrate and briefly describe the Weaver differential governor for water wheels. Though only a general view of the apparatus is given, little difficulty will be experienced in understanding its function and arrangement, the different parts being lettered and suitably referred to in the text.

Copying Presses.

In a neat catalogue just issued by the Illinois Iron and Bolt Company, of Carpentersville, Ill., we find an extensive list of copying presses, press stands and attachments turned out by that company. Twenty different styles of presses are shown, and tables of sizes and prices are given which will enable intending purchasers to make selections which will satisfy their requirements. The manufacturers claim special advantages for their presses in point of material and workmanship, and guarantee them to give every satisfaction within reasonable limits of pressure.

Steam Pumps.

The Hughes Bros. Steam Pump Works, Cleveland, Ohio, have issued a new catalogue, illustrating and describing their different forms of air, hydraulic pressure, and steam pumps in general. The catalogue contains extensive tables of capacities of pumps, prices, &c., and supplies also illustrations of several different types.

A circular sent to the stockholders of the Wisconsin Central Railroad informs them that Mr. Edwin A. Abbott, one of the trustees in possession, Mr. C. L. Colby, president of the company, and others interested in iron mines on the route propose to build a railroad—about 50 miles long—from the Wisconsin Central, near Winnebago or Penokee, eastward to Lake Agongebie, Ontonagon County, Mich., or near to it, to carry ore to Ashland, which would pass over the Central for about 30 miles, and it will give the new line a rebate of 10 per cent. on its pro rata share of all earnings from traffic received from it, provided that it be completed within two years to the Colby Mines, at Bessemer. Wisconsin Central stockholders are invited to subscribe \$1,500,000 for the new line, receiving for each \$5000, \$5000 50-year 5 per cent. first mortgage bonds, \$1000 5 per cent. income bonds, and \$2500 in stock. The privilege to subscribe expired September 11.

The contract for the elevated structure for the Suburban Rapid Transit Company, of this city, let recently, was taken at 3.19 cents per pound, erected.

The Iron Age

AND METALLURGICAL REVIEW.

New York, Thursday, September 23, 1886.

DAVID WILLIAMS, - - - Publisher and Proprietor.
JAMES C. BAYLES, - - - Editor.
CHAS. KIRCHHOFF, Jr., - - Associate Editor.
JOHN S. KING, - - - Business Manager.

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Monthly Edition.....\$1.15 a year.
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—10 marks—6 florins—3 roubles (coin)—12½ lire—
10 pesetas.

Monthly Edition: \$1.25—5/-—6½ francs—5 marks
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THOS. HOBSON, Manager.

PITTSBURGH.....77 Fourth Avenue
ROBERT A. WALKER, Manager.

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HENRY SMITH, Manager.

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The Rise in Raw Material.

The improvement in the value of silk, india-rubber, wool and coffee which has taken place since January 1 is looked upon as an encouraging sign by all business men, and has led to a good deal of speculation in the articles named. Silk was the first to move upward, about the close of last year, a syndicate of Italian bankers having taken the precious fiber in hand at a moment when it ruled lower than it had ever done in the European market. The advance in it is just taking a fresh start. The consumption of wool, it has been found, has increased in a remarkable manner at the expense of cotton, and is outrunning production, leading to a genuine appreciation of some 30 per cent. In india-rubber similar influences have been and are at work, the increased use of it being noticeable in this country even more than in Europe, while the supply is comparatively restricted. The coffee statistics are also favorable enough, but they hardly warrant such a rapid and extraordinary advance, due in a great measure to wild speculation, now setting in.

Owing to large crops some prominent articles have, on the other hand, receded in value, as, for example, cocoa and sugar, and, if we except hops, American products generally are worth about as much as at the beginning of the year, a few even lower. The following table will show the changes which eight months and a half have brought about:

Prices in New York.

	Jan 1.	Sept. 15.
Antimony, Cookson's.....	\$0.004	\$0.004
Coal, anthracite.....	3.50	3.50
Cocoa, Guayaquil.....	1.04	1.18
Coffee, fair Rio.....	.08	.11
Copper, lake.....	.11	.10
Cotton, middling uplands.....	.00 3-16	.00 3-16
Flour, extra State.....	3.25	3.75
Wheat, red and winter, No. 2.....	.91 1/4	.87 1/4
Indian corn.....	.51	.51 1/4
Hemp, Manila.....	.08	.08 1/2
Hemp, Sisal.....	.04	.03 1/2
Hides, Buenos Ayres, dry.....	.22 1/2	.21 1/2
Hops, choice State.....	.11 1/2	.11
India-rubber, fine Para.....	.61 1/2	.54
Black pepper.....	.16 1/2	.16
Sugar, fair refining Cuba.....	.03 1/2	.04 1/2
Tea, Oolong.....	.21	.21
Tallow, city.....	.04 1/2	.04 1/2
Tin.....	20.50	21.80
Wool.....	.15	.15
Spelter.....	.04 1/2	.04 1/2
Tin plate, coke.....	4.50	4.40
Iron, pig.....	18.25	18.25
Steel rails.....	33.00	34.25
Lead.....	4.02 1/2	4.70
Spirit of turpentine.....	.38	.38 1/2
Iron nails.....	2.50	2.00
Nitrate of soda.....	2.42	2.12 1/2
Petroleum, refined.....	.07 1/4	.08 1/4

Whatever improvement there has been was confined for the most part to the products of tropical and colonial countries. The northern countries are still waiting for an improvement in what they produce, and their means of production are immense

and almost unlimited in many articles, and competition is excessive in most of them, it may take many months ere a general revival in the world's trade can benefit them. Moreover, in a few articles, like sugar, for instance, they compete with the tropical countries. But the profits which coffee planters and wool growers are and will be realizing alone suffice to give a great impulse to European and American exportation to the Transatlantic producing countries, and this movement of furnishing all sorts of goods, including luxuries, to populations that had been suffering for years from low prices, of itself constitutes an important element, and will, at any rate, powerfully co-operate toward bringing about a greater demand for manufactures of all sorts. While goods are very cheap in the producing countries, stocks in Transatlantic consuming countries have run comparatively low, importers there ordering little so long as the planting interest was engaged in an almost ruinous industry. All the greater will therefore be the consumptive capability of the coffee and wool producing countries. An advance of 40 per cent. in coffee since January 1 makes a vast difference at a moment when the new crop is just commencing to be marketed.

The change thus wrought, in one direction at least, is a most happy one, and we trust it may inaugurate an era soon to substantially benefit all northern countries like-wise. As the consumptive capabilities of northern countries and British India greatly depends on the size of cereal crops and the prices likely to rule for them during the campaign now opening, we subjoin a table showing the state of crops on September 1, 1886, 100 representing an average yield:

	Wheat.	Rye.	Barley.	Oats.
Austria.....	92 1/2	98	104	107 1/2
Hungary.....	87	82	64	94
Prussia.....	95	87	97	102
Saxony.....	95	90	100	110
Bavaria, Franconia and Swabia.....	100	100	107	112
Bavaria.....	95	85	100	102
Palatinate and Western.....	88	80	88	112
Baden.....	85	70	85	100
Württemberg winter wheat.....	97	92	101	110
Württemberg summer wheat.....	101	88	89	85
Mecklenburg.....	100	86	90	100
Denmark.....	100	85	95	95
Norway and Sweden.....	90	85	95	95
Italy, South.....	89	85	45	45
Italy, Upper.....	125	100	100	100
Italy, Eastern.....	100	100	100	100
Italy, Central.....	80	62	60	60
Switzerland.....	100	55	100	100
Holland.....	90	85	100	112
France.....	85	80	100	110
Great Britain and Ireland.....	75	95	95	95
Russia, Podolia.....	60	47	70	95
Russia, Bessarabia.....	77	60	80	100
Russia, Poland.....	105	72	100	110
Russia, Central.....	55	55	75	100
Russia, Cherson.....	60	90	130	130
Russia, Cernobila.....	75	75	102	102
Russia, Northern.....	85	70	65	65
Russia, Kishnia.....	97	92	77	97
Roumania, Moldavia.....	85	90	90	90
Roumania, Little Walachia.....	90	90	65	70
Roumania, Great Walachia.....	84	105	90	105
Serbia.....	90	85	85	107
Egypt.....	90	50	50	50
British India, wheat, tons.....	1885, 7,713,000	1886, 7,729,000		
United States, wheat, bushels.....	357,000,000	433,000,000		
United States, Indian corn, bushels.....	1,566,000,000	1,650,000,000		

From this latest, and, we may say, conclusive, statement it will be seen that the wheat and rye crops on the Continent and the wheat crop in England are with few exceptions largely short of the average; that consequently there will be a good demand for American wheat and corn. Still the general supply will be ample enough to prevent a rise in prices so large as to cripple the consumptive capacity of the masses in Europe for other commodities. Hence the crops are not likely to be an impediment to a revival in general business on the other side.

While public attention has naturally been quickly attracted to the use of electric motors for propelling cars on city and suburban lines, another movement has been going on here likely to be followed closely, though it is quite as significant. When electric lighting plants were first established in our leading cities their promoters made much of the argument that the same currents supplying light would be also used to furnish power, notably for small industries. The work of developing the business and improving the methods for lighting appears to have crowded out of sight the utilization of the current for power, and it is only recently, when the former does not exhaust all their energies that the companies are turning to the latter. A good deal of progress has been made, however, within a brief space of time. Mr. T. C. Martin, of New York, in a paper read at the Detroit meeting of the National Electric Light Association, estimated the number of small electric motors now in this country for industrial purposes at certainly far beyond 5000. The system followed seems to be generally to sell the motors outright, and to rent the current either for a fixed sum per month, or other unit of time, or by meter. Thus, in Philadelphia the charge for the current is \$5 per month for the first four motors, and then \$1 per month for each additional motor. In Boston \$125 per horse-power per annum is charged. In New Bedford, Mass., the local Edison company supplies current at lamp rates—1.25 cents per 16-candle-power lamp hour. Already electric light companies are furnishing power for every conceivable purpose, supplying small industries and provid-

ing the means of running elevators, ventilating fans, &c. Thus far it has been chiefly the incandescent-light companies who appear to have gone into this business, there being some question whether, with the powerful currents employed in arc lighting there might not be some danger of rapidly burning out the motors. In one or two instances, however, special plant and a system of wires have been put up to distribute power to consumers taking from 1/2 to 100 horse-power each. The business is one capable of enormous expansion, and, now that activity in that direction has fairly begun, we may look forward to many and new applications.

Boiler Firing.

Several months ago we referred briefly to a series of tests which were made in Germany last year to determine the influence of firing on the evaporative powers of steam boilers. Since then we have come into the possession of additional particulars, and take pleasure in presenting now more in detail some of the results which were obtained. The tests, it may be remembered, were carried out under the supervision of the Magdeburg Steam Boiler Association, and only firemen of several years' practical experience were admitted to the competition. Each man fired a whole day, having inspected the coal, the boiler and its setting, and the only condition imposed was to maintain the steam at about a certain pressure (45 pounds) in the course of ordinary working of an engine which was supplied by the boiler. Three money prizes were offered for the three best performances under this condition, and both in point of fuel economy and smoke prevention. The manner in which the different firemen acquitted themselves of their work will be understood at once from the tables which we give. Table I furnishes the results of trials with bituminous coal, and Table II those where lignite was used. The fuel and feed-water were weighed in every case, and the water level and steam pressure were brought to the same point at the commencement of each test.

The grate was rather too large for coal and too small for lignite, having been made so on purpose to see how the men would deal with somewhat difficult conditions.

Table I.—Bituminous Coal.

Fireman.	Pounds of water evaporated per pound of fuel.	Average temperature of feed-water, F.	Average steam pressure, Atmospheres.	Pounds of water evaporated per square foot of heating surface.
1	6.89	71.6	3.07	1.495
2	6.81	74.3	3.10	1.588
3	6.64	104.0	3.2	1.588
4	6.43	98.6	3.09	1.655
5	6.01	91.4	3.00	1.309
6	5.64	85.1	3.15	1.586
7	5.49	85.1	2.80	1.586
8	5.40	79.4	3.5	1.719
9	5.00	96.8	2.93	1.719
10	4.80	76.1	3.9	1.412
11	4.00	80.6	3.16	1.588

Table II.—Lignite.

	Pounds of water evaporated per pound of fuel.	Average temperature of feed-water, F.	Average steam pressure, Atmospheres.	Pounds of water evaporated per square foot of heating surface.
1	2.32	84.7	2.5	1.178
2	1.88	74.3	2.30	1.178
3	1.78	68.2	2.00	1.024
4	1.57	72.5	2.30	1.380
5	1.50	74.5	1.80	0.819
6	1.47	83.6	1.58	1.248
7	1.47	69.8	1.58	1.073
8	1.46	71.6	1.7	0.839
9	1.44	66.2	1.99	1.024
10	1.33	71.6	2.15	1.075
11	0.95	83.6	1.38	0.410

The results throughout are exceedingly poor, a fact which may to some extent be explained by the circumstance that the boiler was set with one of the many patented furnaces brought out within late years, and which, notwithstanding the claims made for them, have often turned out to be complete failures. The furnace walls could not be made even approximately tight, and numerous air leaks vitiated the results. This, however, does not explain the otherwise remarkable character of the figures. The main conclusion to be drawn from the test records is clearly that even after several years of training there is a vast difference in the degrees of proficiency attained by firemen in utilizing the heat of coal. In the present case, it will be noted, among 11 firemen the best result obtained was the evaporation of 6.89 pounds of water per pound of bituminous coal, while the poorest figure represented an evaporation of only 4 pounds of water, there being thus a difference between the highest and lowest of about 44 per cent. With lignite the corresponding figures were 2.32 pounds and 0.95 pound of water.

It is not necessary to comment at any length on these results. They convey their lesson in too simple a manner to require explanation, and clearly point out a source of loss in steam raising to which those materially interested rarely give a due amount of attention. If in a trial, as in this case, where special inducements are offered to encourage high efficiency, a saving of almost 50 per cent. in fuel can be effected by one fireman over another, it is not difficult to form some idea of the extent of the loss which must occur in every-day working. With increasing competition the cost of coal in manufacturing becomes a most important item of expense, and a careful consideration of circumstances directly affecting it is, to say the least, advisable.

With the introduction of high-class machinery of nearly every description, complexity of design has developed into what seems to be considered a most natural re-

sult, and the machine user of the present day has become accustomed to a mass of intricate detail which not so very long ago would have caused no end of criticism. In certain lines of machinery—as, for example, special machine tools—this rapid multiplication of parts has been the direct and unavoidable outcome of increased requirements of capacity, and is therefore entirely legitimate. In others, however, there seems to have been unnecessary refinement of practice, and it is highly questionable whether the results have always, or even in isolated cases, given that comparatively greater degree of satisfaction which was expected. In the field of marine engineering prominent examples bearing on this point will be found. The abundance of detail, the multiplicity of parts and the number and variety of special appliances are here often overwhelming, notably in the engines of some of the fast Atlantic steamers, though it does not follow that they are necessary or desirable in the propulsion of a ship. Marine engines have been designed and built which, though it must be admitted, of not such large proportions and power as these, are of the utmost simplicity and have given results in every way satisfactory. Comparisons of such examples very naturally suggest the thought that simple forms of construction might easily and advantageously have been adopted in all cases where they are now lacking, and should receive greater attention in future work. Complexity in design means increased cost of construction, greater difficulty of management and greater cost of maintenance, and unless these can be offset by corresponding gains in economy, greater reliability and other features of importance it is clear that the tendency of engine builders should be.

The Outlook for Tin Plates.

In spite of the rise and subsequent fluctuations in the tin market, tin plates have been remarkably steady, and the present price is about the same it was early in the spring. The import into the United States during the fiscal year ended June last was 254,956 tons, net, against 226,195 tons the previous year, yet this increase of 28,758 tons notwithstanding stocks in port and in the distributing centers out West were on the 1st inst. quite light, thereby proving that the country has at the low prices ruling absorbed without difficulty the excess of importation.

The fruit crop being ample this year, and that of lard, salmon, &c., fair, while petroleum continues to rule low, canning has

Works existing in	1750	1800	1825	1850	1860	1865	1870	1875	1885
Glamorganshire.....	2	4	8	12	15	19	27	44	
Monmouthshire.....	2	4	8	12	15	19	27	44	
Cardiffshire.....	2	4	8	12	15	19	27	44	
Staffordshire.....	2	4	8	12	15	19	27	44	
Worcestershire.....	2	4	8	12	15	19	27	44	
Gloucestershire.....	2	4	8	12	15	19	27	44	
Scotland.....	2	4	8	12	15	19	27	44	
Herefordshire.....	2	4	8	12	15	19	27	44	
Flintshire.....	2	4	8	12	15	19	27	44	
Cumberland.....	2	4	8	12	15	19	27	44	
Total.....	4	9	16	34	40	47	59	75	96

Estimates of 1884 production.
Per annum of 12 months..... 230 mills.
Per month of four weeks..... 21,500
Per week of six days..... 1,658
Per day of six hours..... 132,615
Per day of 24 hours..... 414

been and will be carried on as vast a scale as it ever was before. The building trade has probably picked up sufficiently during the summer to compensate for the interruptions and drawbacks that hampered it in the spring. Whichever way we may therefore look the outlook is most promising, so far as a continued large consumption of tin plates is concerned, the more so as the price is low enough to stimulate consumption and even lead to the anticipation of requirements, as the present demand for "futures" indicates. The distribution of tin plates abroad from Wales was last year as follows:

	Boxes.
United States.....	3,776,877
Canada.....	309,445
Mediterranean and Black Sea.....	255,712
Holland, Germany and Belgium.....	222,782
Norway, Sweden and Baltic.....	125,445
China and British India.....	98,979
France and Switzerland.....	100,560
Australasia.....	137,918
Spain and Portugal.....	98,572
South and Central America.....	88,963
West Indies.....	12,888
Cape, Ceylon and Mauritius.....	5,760
South Africa.....	3,494
Sundry other countries.....	3,563
Total.....	5,280,535
Home consumption.....	1,850,000
Total consumption.....	7,030,535

In other words, the United States took last year 54 per cent. of the entire output.

In a paper recently read by Mr. Philip W. Flower, of Neath, before the British Iron and Steel Institute, that gentleman remarked with reference to the gradual substitution of steel for iron in the manufacture of tin plates:

"The surface of the steel tin plates was always found to be sufficiently smooth and good, but violent and apparently capricious variations in toughness caused the plates to be unfavorably graded by experienced dealers, and the trade for several years had to be forced at a lower price than for charcoal. This preliminary irregularity, however, was gradually surmounted, and as gradually the trade expanded, until in 1880 the Landore Company were sending out 600 tons of bars weekly. The successful manufacture at Landore created a revival of the Elba Works, near Swansea, about 1878, which was followed by the construction of 10 new furnaces in South Wales:

Birchgrove Steel Co.....	2	Swansea Valley, 1880
Morewood & Co.....	2	Llanelli, 1880

Morewood & Co.....	2	Cwmwria, 1883
Leach, Fowler & Co.....	2	Neath, 1883
John S. Tregoning & Co.....	2	Llanelli, 1883

"The three important advantages which are claimed from the employment of steel may be stated as follows:

"1. Economy in the waste which results in the conversion of bar iron into black plate.

"2. A reduction in the percentage of waste tin plates.

"3. A reduction in the weight of coating metal, resulting from the smoother surface of steel black plate."

While alluding to the changes of manufacture gradually brought about, the same gentleman drew the following short sketch, which it may not be out of place to recapitulate: "The modern process of manufacture being now so well understood, I think it will be sufficient for me generally to record the approximate dates of the several important improvements which have been adopted since a knowledge of the art came to England in 1665; but as the introduction of steel is of such recent date, and has so completely revolutionized the trade, I propose to examine this feature specially. In 1728 the introduction of sheet-iron rolling by Major Hanbury, of Pontypool, which was described at that period as the 'art of expanding bars by compressing cylinders.' In 1745 the employment of a grease-pot to warm and prepare the iron for receiving a coating of tin. About 1770 the application of pit coal as a substitute for charcoal in the manufacture of iron. In 1806 the substitution of vitriol for barley meal as a medium for pickling purposes. In 1807 Mr. Watkin George, of Pontypool, introduced the dandy fire as a preliminary process for the refinery, and the brick hollow fire as a substitute for balling. In 1829 Mr. Thomas Morgan introduced cast-iron annealing pots as a substitute for annealing in an open furnace. About 1849 the black pickling by vitriol was introduced as a substitute for scaling. In 1866 patent rolling, so called, of the tin plates as they leave the tin-pot was introduced by Mr. Edward Morewood, of London, and Mr. John Saunders, of Kidderminster. In 1874 pickling machines were generally introduced as a substitute for hand labor. In 1875 the introduction of Siemens soft steel as a substitute for charcoal iron. In 1880 the adoption of Bessemer steel as an equivalent for puddled bar iron. In 1883 the introduction of basic steel blooms from Middlesboro' in competition with Bessemer bars."

The figures produced by him having reference to the gradual increase of output were as follows:

Works existing in	17
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they think the exceptional advantages of those of their rivals who are blessed with an ample supply of natural gas would do well to look into the use of producer gas. They can reduce their fuel cost and need not fear the claims of those who have secured better quality of product by the introduction of natural gas.

Immoral Business Methods.

Some months since Sheffield was agitated by serious charges publicly and specifically brought against some of its manufacturers and merchants. It was insisted that cheap, inferior German goods were bought by them, and after being stamped, labeled, packed or mounted in close imitation of Sheffield articles they were sent out as goods made there, in many instances being designated as being best quality. The corporation of Sheffield was forced to take up the matter, placing its investigation into the hands of a committee. The latter, after thoroughly going over the ground, have reported that the charges have been sustained. The following sentences from this report will convey some idea of the magnitude of the evil:

In the judgment of this committee the practice of putting labels on goods manufactured in Germany, intimating that the same are from or manufactured by Sheffield firms, exists to a large extent. * * * The practice of putting labels on parcels of Sheffield goods, denoting them to be of a different description and quality to what they really are, exists to a considerable extent, and is doing much injury to the trade of Sheffield. * * * In numerous cases in which corporate or trade marks have been granted by the Cutlers' Company, such marks have been sold by the person to whom they were originally granted, and are now used by the purchasers for the passing off of German goods of inferior quality. The use of these corporate marks in this manner is calculated to deceive persons into the belief that such goods are of Sheffield manufacture.

The *British Trade Journal*, in reviewing the evidence collected by the committee, points out some of the most glaring cases of fraud:

The evidence shows most clearly that such articles as scissors made of common cast iron are sold as best steel. Table knives the blades of which have simply been stamped out of Bessemer sheet steel are branded as silver steel or shear steel, and made up with forks of common cast iron are sold to the public as "cutlery of best Sheffield manufacture." German goods of the same character have been imported by Sheffield houses and then sent out marked with English marks or wrapped up in parcels outside of which were English labels, or mounted on cards on which were printed statements to the effect that the cutlery on those cards was best Sheffield and had been made in Sheffield.

Some of the offending traders and manufacturers followed the summons of the committee to testify before it. They fully admitted that they had done business in the manner charged, but they believed it to be a justification of their course that those who bought from them were fully aware of the character of the goods which they were purchasing. That is to say, a number of distributors of this class of goods are the accomplices of the Sheffield merchants. They attempt to share with them in the profits obtained by selling to a consumer at the price of a standard article goods much inferior in quality. Nor can it be pleaded that the consumer wants a cheap article. The wrong lies in the deception practiced, and is not righted by the fact that all, from the manufacturer down to the smallest retailer, enter into the conspiracy. We know that this class of goods has come to this country in large quantities, and it has resulted simply, as it inevitably must, in destroying the faith of buyers in the quality of imported goods, and in causing them to turn with growing confidence to articles of American manufacture, since all interested in the trade in domestic wares must look to the future. Manufacturers, jobbers and dealers cannot afford to sacrifice the good-will of customers for temporary gains, however tempting they may be.

From England come the first indications of an uneasiness of labor which may possibly develop into a more general movement. The principal factor leading to it, if we may judge from our own experience, will be the anxiety to foster the first signs of improvement by encouraging talk, notably in the newspapers. Distorted and exaggerated accounts will come to the workmen from all quarters, and may result in a determination on the part of the men to share in these benefits. We know that the purchases from this side have led to slightly higher values in the steel trade, and with wages screwed down to the starvation point it would be not at all surprising if the English masters would have to go through a period of strikes as soon as the tide has fairly set in the direction of an improvement.

English guns and English man-of-war engines alike have shown themselves to be far from creditable to their designers and constructors, and for several years past every new trial has developed defects of the most serious character. The latest addition to the already long list of break-downs in the navy is found in the case of the twin screw dispatch boat *Phaeton*, particulars of her latest trials having come to hand a few days ago. During one of the runs, while the engines were being driven at comparatively slow speed, the high-pressure cylinder cover was fractured. The defects having been made good, another trial was ordered, but before much progress had been made the low-pressure cylinder was considerably more

fractured than the high pressure cylinder at the former trial. Examination showed that in addition the piston-rod was broken inside the cylinder, the break being as clean as though the rod had been cut with a knife. Owing to the secrecy practiced by the British Admiralty the results of the investigations are not known, and it is not probable that particulars of a very damaging character will be allowed to leak out. Taken altogether, however, there is sufficient evidence to show that British machinery and British practice in this line of engineering in general have been very highly overrated. There is a limit to experience on which enterprise in machine construction may be safely based, and this the British authorities have evidently ignored. Adding to this circumstance the influence of structural defects, it is not difficult to explain the disastrous results which have been experienced. Distrust of the engines in the navy has apparently gone so far as even to effect a reduction, in some cases from six to three hours, in the duration of full-power trials of the vessels. The inferences to be drawn from all this are not flattering. English papers do not disguise the facts, and one of them, the *Engineer*, significantly remarks that "the full-speed power of most of our ships, as stated in Parliamentary reports, is from 25 to 30 per cent. higher than that at which it is safe to work their engines." We note that according to latest reports, moreover, the machinery of another British war ship has come to grief. Of this, however, nothing definite is yet known.

WASHINGTON NEWS.

(From Our Regular Correspondent.)

WASHINGTON, D. C., September 21, 1886. The last of the 8 inch guns for the steel cruiser *Atlanta* has been completed at the Washington Navy-Yard, and has been shipped to the naval proving ground at Annapolis to be tested. These guns have thus far given complete satisfaction. The battery of the *Atlanta* consists of two 8 inch guns *en barbette*, throwing a 250-pound projectile 8 miles with 125 pounds of powder, and six 6-inch broadside guns. The second battery consists of two 6-inch and two 3-pound Hotchkiss high-power guns; two 47 mm. and two 37 mm. Hotchkiss revolving cannon. If the gun to be tested proves without flaw the *Atlanta* will be fully equipped and ready for sea in a very short time. Captain Bunce in reporting the trip of this steamer from New York to Newport says she made 11 knots an hour easily and her engines worked very successfully.

TRANSFER OF THE WASHINGTON NAVY-YARD. The official order of the Secretary of the Navy in reference to the transfer of the navy-yard for ordnance work, just issued, says: "The demand for increased facilities for constructing the batteries required for the armament of additional ships of war, now provided for, makes it necessary to reassign the shops and buildings of the Washington Navy-Yard. All the shops, machinery, tools and appliances assigned for the use of the Bureau of Construction and Repair, Steam Engineering, Yards and Docks and Equipment and Recruiting will therefore be turned over to the control of the Bureau of Ordnance on the first day of October, 1886. Such of the machinery, tools and appliances as may not be required by the Bureau of Ordnance will be transferred to stations where required by other bureaus, or otherwise disposed of as found best for the public interest. The quarters now occupied by the representatives of the above-named bureaus will be vacated October 1."

PREPARATIONS IN THE NAVY DEPARTMENT. The Acting Secretary of the Navy, Commodore Harmony, has issued instructions to Bureaus of Construction, Steam Engineering, Employment and Ordnance in anticipation of possible failure to receive proper bids from private parties to prepare plans for the two seagoing, double-bottomed, 6000-ton armored cruisers authorized by act August 3. The chiefs of these bureaus are directed to commence this work without delay, so as to be prepared to construct these vessels in the yards of the Government if no suitable plans are offered. In accordance with these directions the chiefs embraced in the instructions have already commenced on their plans, and expect shortly to have their work in a satisfactory state of forwardness. The department is now in possession of drawings of the finest armored vessels of war afloat, and proposes to make designs which will combine the best features of naval architecture of other nations with improvements which have been suggested by experience in the working of these vessels in service, and by careful study of their details of construction. This will bring the ideas of naval officers upon the needs of the service in this class of vessels into competition with private contractors, and may result in dividing the work, giving one vessel to a private yard and building one under the auspices of the Government. The time for the construction of these armored vessels will be between two and three years.

DUTY ON MOLDING SAND.

The Treasury Department has instructed the customs officers, in regard to certain Canadian molding sand claiming entry free, that under date of the 16th of July, 1884, the department decided that as molding sand is not specified in the tariff acts, either by name or otherwise, and as it is a crude substance, it is dutiable at the rate of 10 per cent. ad valorem.

PLATFORM CAR, TURN TABLE, ETC.

On an appeal from 2½ cents a pound duty on a platform car and 1¼ cents a pound on a turn-table, the department decides that a platform car is a completed article, composed in part of steel, and dutiable as claimed by the appellant. The turn table, a casting of iron taken solid out of the mold and intended for turning cars, is dutiable at the rate assessed as a casting of iron.

DUTY ON OLD COTTON TIES.

Iron bands of domestic manufacture exported as protections for bales of cotton, which are cut from the bales in the foreign country and are returned to the United States in the condition of old scrap iron, are not entitled to free entry as manufactures of the United States exported and returned, because they are not returned in the same condition as exported.

Steam-Engine Breakdowns.

Referring to Mr. Longridge's annual report for 1885, as engineer to the Engine, Boiler and Employers' Liability Insurance Company, England, the *Engineer*, London, says:

The report contains a great deal of interesting information, such as can be obtained nowhere else. The company, as no doubt most of our readers are aware, insure engines as well as boilers, and Mr. Longridge has therefore excellent opportunities for learning how and why engines break down. He has to record no fewer than 106 failures during 1885, while 795 occurred during the last six years. This is a very large number, and most steam users will agree with us that it might be reduced with advantage. It is very often assumed that a breakdown is always the result of carelessness on the part of the attendant, or of neglect from parsimoniousness or other reasons of the owner to get repairs done in good time; but Mr. Longridge's figures go to show that this is not the case. The cause of the 106 breakdowns may be thus classified: 41 per cent. were due to causes purely accidental or unascertained, 13 to old-standing defects and ordinary wear, 30 to weakness or bad design, and only 16 were attributable to the negligence of the owners or their servants. Out of the whole 106 no fewer than 24 were failures of spur gearing, and we may put these on one side as not belonging properly to engine failures. Of the rest we find that valve gear gave way frequently, and that air pumps gave still more trouble. In 11 instances the gear for driving the air pumps broke, and in 12 cases the buckets or valves failed. One "total wreck" is recorded, but the cause was not ascertained; in five instances the crank-shafts broke. It will be interesting if we examine more closely a few typical examples from the many particularly by Mr. Longridge.

The eccentric-rod of a beam engine was broken because the engine man had neglected to oil the slide-valve. For a similar reason one of the eccentric-rods in a pair of horizontal compound engines was broken. In another pair of tandem engines a slide-valve spindle and one rocking-shaft pedestal were broken from the same cause. In a beam condensing engine the eccentric-rod was broken in the same way. These facts throw a good deal of light on the enormous frictional resistance of slide-valves, and show how dependent they are for proper working on lubrication. This is especially the case when steam dry and of a high pressure is used. Some of the failures recorded by Mr. Longridge are very curious. Thus, a horizontal tandem engine was broken down by a lump of hard grease; the cylinders were 23 inches and 43 inches diameter and 5 feet stroke; the engine made 65 revolutions per minute; the power was given off by a spur-wheel 9 feet in diameter with teeth 14 inches broad and 3¼ inches pitch, both the wheel and pinion being covered by a sheet-iron guard in the usual way. "The grease," says Mr. Longridge, "used for these wheels must have been very hard, or there must have been some hard substance in it, for in applying it while the engine was at work a lump was carried round with the teeth and lifted the cover off its fixing. The cover dropped upon the wheel and was torn to pieces. Both wheel and pinion were smashed, the boss of the wheel only remaining on the shaft. In connection with this breakdown it may be mentioned that one of the company's inspectors, when making his periodical inspection of another insured engine, found an indentation on one of the teeth of the spur-wheel which could not be accounted for by any one at the mill. On inquiry he ascertained that the manager had given orders to clear all the old grease out of the wheel-race and to use it over again. From this the inspector inferred—and his inference is probably correct—that a small piece of iron hidden in the grease had been carried round by the wheel until it came in contact with a tooth of the pinion, causing the indentation. As it happened, the teeth were strong enough and the clearance sufficient to allow the piece of iron, or whatever it was, to pass through without further damage. But the experiment is not one to be repeated with impunity, and it therefore seems well to mention it as a warning to mill managers and engineers against the use of old grease from the wheel-race."

In another instance there was a very thorough smash-up of a condensing beam engine with a cylinder 30 inches diameter and 5 feet stroke. This breakdown occurred about noon, without warning and without apparent cause. The inspector, on arriving shortly afterward, found the beam broken in front of the main gudgeon, the connecting-rod end, together with part of the connecting-rod, lying at the bottom of the foundation, having carried away the floor. The other part of the rod, with the exception of a small piece which remained attached to the crank pin, was jammed across the opening in the floor. The fly-wheel and driving-wheel were lying in pieces at the bottom of the wheel race, even the boss of the former being broken; in fact, nothing was left on the shaft except the crank. The spring beams had broken, and the floor of the beam chamber was pulled down. The cylinder bottom was broken; no cause could be assigned. Mr. Longridge thinks it possible that the beam broke first, possibly because of water in the cylinder; but this is only an assumption. In another instance a small vertical engine was smashed by water flowing over into the cylinder from the condenser. The engine had been slowed down, but the injection-cock was left full open.

We have said that a large percentage of breakdowns occurred to air pumps and their gear. Several of these were due to neglect.

Of no fewer than six breakdowns Mr. Longridge says: "All these breakdowns would have been avoided if proper care had been taken, for they all arose from defects which should have been detected by intelligent examination. Air pumps, buckets and valves are perhaps more liable than any other parts to get out of order, and yet they are frequently the most neglected. When we consider the concussions to which all the fastenings and joints about an air pump are subjected every stroke, and the gritty and corrosive nature of the water in which the rods and buckets often work, it must be evident that special vigilance must be used if damage is to be prevented. The chambers in which the pumps are placed should be kept as clean as other parts of the engine-house, instead of being, as they often are, too filthy for any one to enter without a change of clothes. They should be made accessible by permanent staircases or ladders and flooring, and should be well lighted, if possible by daylight, and if not, by gas. If this were done many of the difficulties of making a proper examination would be removed and breakages would certainly be fewer. It is also recommended that metallic packing for buckets should be abolished. It is both a useless expense and a source of danger. A plain brass or iron bucket about 12 inches deep when the water is free from sediment, or one with wood lagging when it is gritty, will answer every purpose, for it is not necessary that an air-pump bucket should be tight in the same sense as a piston."

Mr. Longridge very properly urges the use of proper curves and fillets in all cases where the diameter of a shaft or rod suddenly changes, and he particularly insists on this when steel is used. Indeed, it is easy to see that he is not specially enamored of steel—Bessemer steel, at all events. He mentions one instance where, a crank-shaft having broken, it was replaced by one of Bessemer steel, against his advice. There was a slight change in diameter where the crank was put on. There was no fillet, the change being made abruptly. The result was that a crack commenced at the corner and ran into the bearing, which it caused to heat, whereby the engine-man's attention was attracted, and the mischief discovered before the crank dropped off. The shaft was 5¼ inches in diameter in the journal and 5¼ inches in the crank-seat, so that the shoulder was only ¼ inch diameter, a quantity which might have been accepted as too small to do any harm. Mr. Longridge also gives particulars of the breakage of a crank-shaft in the case of an uninsured Corliss condensing engine with a cylinder 40 inches diameter by 5 feet stroke. The main shaft was of Bessemer steel 15 inches diameter in the neck, swelled to 15½ inches at the end to receive the crank, which was held by a steel key after having been forced on to the shaft, probably by hydraulic pressure. The keyway in the shaft extended the full length of the swell, and was cut perfectly square in all the corners. The fracture which led to the destruction of the shaft commenced at the inner end of this keyway and extended across the shaft, partly within the crank and partly through the neck, and on one side branched off parallel to the axis of the bearing. The final fracture appears to have taken place as the crank passed the outer center and when the piston was commencing its return stroke; the latter being thus freed was driven against the back-end cylinder cover, smashing it and also the cylinder. The engine-man was found dead near the engine-house door, having either been killed by the shock or suffocated by the steam. At the coroner's request Mr. Longridge made a report upon the accident, attributing it to intense local stress at the corner of the keyway, produced by sudden change of form in a material which, whether from initial strain set up in cooling or from some other cause at present unknown, has proved itself unfit to bear such sudden changes. We may add here that Mr. Longridge has obtained particulars of no fewer than 64 breakdowns of uninsured engines. In 17 cases the main shafts gave way, in 12 the spur gearing was smashed, and in four the engines ran away and the fly-wheels were smashed to pieces.

It is impossible to read this report without seeing that, although actual neglect or false economy brought about but a comparatively small proportion of the breakdowns recorded, the number of these would have been reduced had more vigilance been manifested. There is a considerable margin between positive neglect and supineness. An engine-man may do his duty so fairly well that it is impossible to find fault with him, while his performance is so far from perfection that it is equally impossible to praise him with justice. In the same way, while many steam owners do all that is believed to be necessary, and with promptitude, they use the word "necessary" with a certain degree of latitude which leads to bad results. The very fact that the cause of a large number of breakdowns was unknown seems to us to be evidence of want of vigilance on the part of some person or persons. Take, for example, No. 21 in Mr. Longridge's list. "Beam condensing, wrought-iron crank-shaft broken off close to the fly-wheel boss; cause of damage not ascertained." Now, it is an almost unheard of event for a wrought-iron shaft to break without giving evidence of weakness beforehand. We hear nothing here of a latent flaw, and it is hard to resist the conclusion that if the cap had been lifted and the crank examined with care a crack would have been discovered. Every crank-shaft ought to be stripped and examined once in three months. The operation does not take long, and will go far to secure the owner of the engine against a bad accident. Of course we are here referring only to shafts of some size, say over 5 inches in diameter. Again, take the following: "No. 8, horizontal condensing engine. Wrought-iron crank-shaft, crank pedestal, brass steps, two pedestal-cap bolts, slide-bars, 18 cylinder-cover bolts, gib and cotter for air-pump connecting-rod, and two air pump slide bars, connecting-rod, crosshead, air-pump connecting-rod broken and piston-rod bent. Cause of failure: Absence of a fillet at junction of neck to body of shaft. The square corner had started a fracture at each side of the shaft, in the line joining the centers of the shaft

and crank-pin. These fractures had extended through the shaft in a direction at right angles to its axis, and were within 2 inches of meeting when the shaft broke. Owing to the position and direction of the fracture the neck did not heat."

It seems to be almost certain that if the shaft had been examined the fracture would have been discovered. We will not pursue this line of argument further. If breakdowns are to be avoided vigilance must be displayed in looking for premonitions of failure; and we may rest assured that steam users will best consult their own interests if they make it worth the while of their engine-men to discover and report the existence of any defect which, if not remedied, may lead up to serious consequences. We fear that only too many pursue a precisely opposite course, and discourage their men when they manifest any tendency to make what are very much mis-called "complaints."

The Lartigue Elevated Railway.

Several years ago we described briefly an ingenious system of elevated railway invented and worked out by Mr. Lartigue, a French engineer. In view of recent developments with it, however, further details are of interest. The main feature of the system, as may be remembered, is that the line is laid with a single central rail, and is elevated only in the sense that this rail is not laid directly on the ground, but about 3 feet 4 inches above it. The line itself consists of a rail of light section which is carried on the top of a series of wrought-iron A-frames or trestles, the feet of each frame being secured to a light channel-iron sleeper. The trestles are occasionally and where necessary tied in with wrought-iron diagonal bracing placed in the plane of the railway. A short distance from the ground small guide rails are fixed to the sides of the A-frames so as to project laterally to the right and left of the central line. This completes the railway proper, which is provided with crossings and other constructive adjuncts of a very simple character where necessary. In cases where steep gradients have to be ascended a rack rail is laid alongside the main rail, and where the line has to be carried at a considerable elevation above the ground level timber trestles are used, rivers and ravines being spanned also by timber structures. Lines thus constructed are at work in Algeria in connection with the *esparto* trade, where they are worked by mules, and also at the mines of Ria, Pyrénées Orientales, where electricity supplies the motive power. In order, however, to approximate the system more closely to that of the ordinary steam-worked railway M. Lartigue secured a colleague in M. A. Mallet, who designed a locomotive for working the single-rail system.

To realize the manner in which the traffic is carried on this system it will be well here to state that it is, so to speak, hung across the railway, just as panniers are hung on mules and the thellis on camels. It was, in fact, the sight of a caravan of camels following each other in a long string and laden with the thellis, a kind of wallet which hangs down on each side of the animal, that suggested the single-rail system to M. Lartigue. The locomotive designed by M. Mallet for working the line consists of two vertical steam boilers placed one on each side of the line and connected together by pipes. The two cylinders are placed horizontally, and with the boilers and driving gear are carried in a framing. The whole is hung on two coupled grooved driving-wheels 1 foot 9 inches diameter, which run on the rail proper. On either side of the engine and near ground level are two horizontal pulleys, which take into the guide rails on the sides of the A-frames already described, and which prevent the machine being thrown out of equilibrium by accident or by centrifugal force when going round curves. In its normal condition, however, the engine as well as the rolling stock is balanced. In order to assist traction on steep gradients an auxiliary apparatus is attached to the engine. This consists of a small steam cylinder working a spur-wheel which gears into the rack placed beside the main rail, and to which reference has previously been made. The locomotive is fitted with a powerful hand brake and with the Westinghouse continuous automatic brake, which is also applied to the rolling stock generally. The cars are of various kinds, some open and some closed, the passengers sitting back to back. The freight cars are similarly constructed, and all are fitted with central buffers and draw-springs and the usual rolling stock details. They are each hung on a pair of vertical grooved wheels, similarly to the locomotive, and have a pair of horizontal pulleys working against the guide rails.

The Lartigue system, we understand, has recently been practically established in London. There a permanent passenger line and a portable line for military, agricultural or industrial purposes. The permanent system is illustrated by two lines, one of which is practically level and is used for demonstrating the speed of the train. The other is an irregular line with curves of as small a radius as 49 feet, and with gradients as steep as 1 in 10, the total length of the two lines being 1540 feet, each being of about the same length. The latter line demonstrates, on the steep gradient of 1 in 10, the use of the rack rail and auxiliary driving gear. On this line also is a wooden viaduct 340 feet long, with steep gradients and sharp curves, and it also includes a bridge of 33 feet span, where it crosses another line. This is the first demonstration of the system as worked by steam, and is pronounced a success.

Not only have locomotive cylinder diameters increased within the past few years, but pressures also have augmented. They have risen from 120 pounds, which was considered high not so long ago, to 150 pounds, and in some boilers 175 pounds are now carried. These things all mean more weight, because the boiler must be heavier, and all parts of the engine must be increased in dimensions to bear the additional strain. Under such circumstances the constant increase in the weight of locomotives is but natural.

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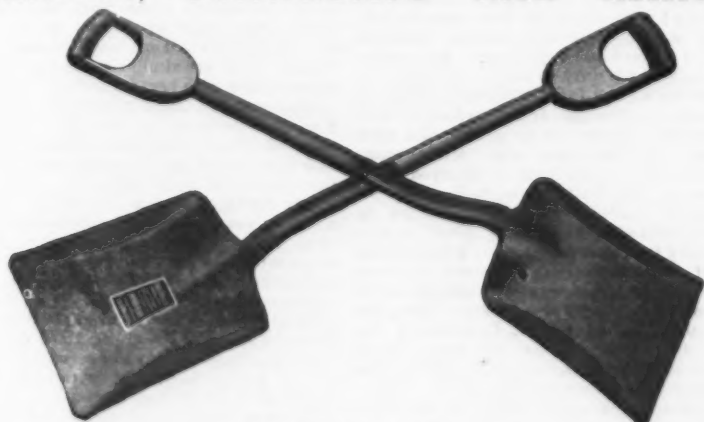
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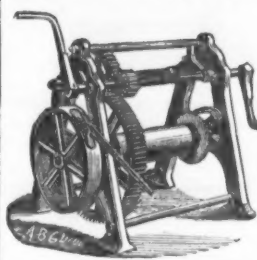
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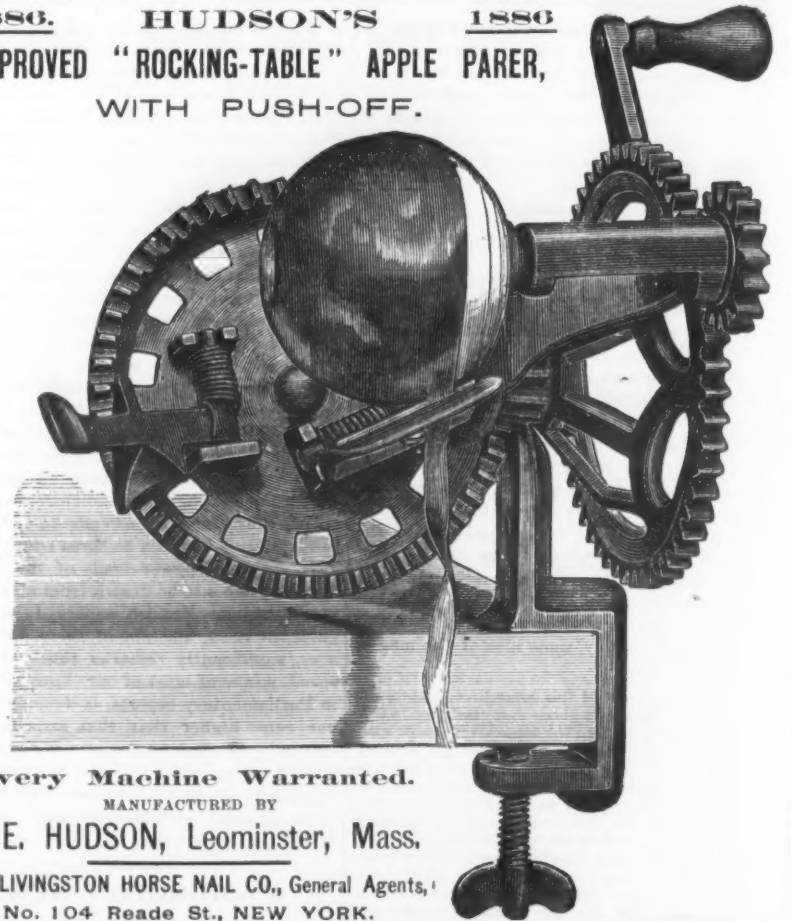
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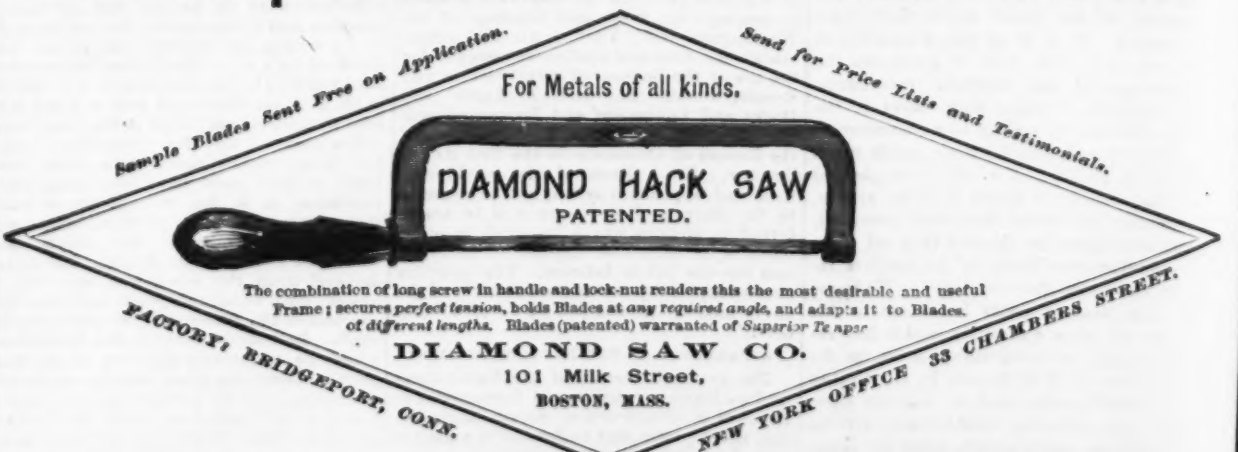
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BELLOWS The Best for the Money.
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E. MERRITT & CO. ESTABLISHED 1859 - BROCKTON, MASS. The Only Manufacturers of a Complete Line of TACK AND NAIL MACHINERY. SEND FOR CIRCULAR - UPRIGHT DRILLS.

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We have just completed our extensive works, having
put in all modern machinery and appliances necessary to
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CARBONS FOR ELECTRIC LIGHTING,

and also CARBON PLATES. We have associated with us
SKILLED LABOR as well as the most practical experts in
the Electric Light field, who thoroughly understand every
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fore say positively that we are now able to supply a Carbon
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pleased to receive a sample order.

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MANUFACTURERS OF

Ornamental Bronze, Brass or Iron Work, Builders' Hardware, &c., Railway, Cabinet and Antique
Furniture Trimmings, Office and Bar Rails, Bank and Vault Work, Cemetery
and Altar Rails, Tabernacle Doors and Decorative Church
Work in Cast or Repouse.

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For Farm, Fruit, Coal, Ice and
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Wagons of all Descriptions.

Wagon Tongue Support
for Thill Coupled or
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A. MUGFORD, Hartford, Conn

Trade Report.

New York.

American Pig.—While current business is confined to covering requirements for immediate and early delivery, the feeling of confidence is growing stronger. It is characteristic of the closeness with which many consumers are running that any delays in deliveries cause immediate and urgent reminders to sellers. No. 1 Foundry is scarce, and the number of sellers willing to part with moderate-sized lots of standard brands at \$18 is growing very small. No. 2 and Gray Forge are in more plentiful supply. We quote standard brands Foundry No. 1, \$18 @ \$18.50; No. 2, \$17 @ \$17.50, and Gray Forge, \$15.75 @ \$16.25.

Scotch Pig.—The market is dull and is little affected by the better advices from the other side. We quote nominally as follows for small lots: Coltness, \$20 to arrive; Gartsherrie, \$19.50 to arrive; Shotts and Langloan, \$19.50 @ \$20 to arrive; Carnbroe and Glenharroch, \$19 to arrive; Summerlee, \$19.75 to arrive; Dalmellington, \$19 to arrive; Eglinton, \$17.75 @ \$18 to arrive, and Clyde, \$19 to arrive.

Bessemer Pig.—This market is dull at \$18.75 @ \$19 nominally for Foreign at tide-water, and \$18 @ \$18.25 for Domestic at furnace. Advices from the West show that the markets have recovered from the decline of the past months. Contracts for Foreign Ore for 1887 delivery have begun to be made. We hear of 75,000 tons thus entered at about last year's prices, delivered in Pittsburgh. Freight rates for Foreign Ore from Spain and the Mediterranean have latterly advanced to 10/6.

Spiegel Eisen.—We hear of sales aggregating 10,000 tons for 1887 at private terms. We quote \$25 @ \$25.50 for 20 % English Spiegel Eisen.

Bar Iron.—The market is more active than it has been for a very long time, orders for round lots coming in. The demand appears to be chiefly from large consumers, although dealers, too, are beginning to show a disposition to stock up. The market is firm. We quote for round lots, on dock, Common Iron, 1.6¢ @ 1.70¢; Medium, 1.70¢ @ 1.75¢, and Refined Iron, 1.8¢ @ 1.9¢.

Structural Iron and Steel.—The market is more active, and prices show a hardening tendency. We quote, according to quality, for Angles 2¢ @ 2.20¢, delivered, and Tees at 2.5¢ @ 2.6¢, for round lots. Steel Angles are quoted 2.40¢ @ 2.50¢, according to quality. Store quotations remain 2.35¢ @ 2.4¢ for Angles, and 2.7¢ @ 2.8¢ for Tees. American Beams and Channels are nominally 3¢ base from dock for all orders.

Plates.—The market has been active, and there have been a number of sales of round lots of Steel and Iron Plates. The mills are very full, and higher prices are generally demanded. We quote for round lots: Common or Tank, 2.2¢ @ 2.25¢; Refined, 2.35¢ @ 2.40¢; Shell, 2.5¢ @ 2.6¢; Flange, 3.40¢ @ 3.5¢; Flange, Extra, 4¢ @ 4.1¢. For small lots of Steel Plates the quotations are as follows: Tank, 2.70¢ @ 2.75¢; Ship, 3¢; Shell, 3.1¢; Flange, 3.5¢, and Fire-Box, 4.1¢ @ 4.5¢, on dock.

Merchant Steel.—We quote nominally for the range of ordinary to good grades as follows: American Tool Steels, 7.5¢ @ 9¢; Tool Steel of special grades and finer qualities, 12¢ @ 20¢; English Tool, 13¢ @ 15.5¢; common grades, 7¢ @ 9¢; Crucible Machinery, 3.75¢ @ 4.50¢. The Steel Association quotes base prices: Round and Flat Spring, 2.6¢; Round-Edge Tire, 2.3¢; Square-Edge Tire, 2.5¢; Toe Calk, 2.4¢; Sleigh Shoe, 2.2¢ @ 2.5¢; Open-Hearth Machinery, 2.5¢, and Bessemer Machinery, 2.5¢.

Steel-Wire Rods.—The advance in the price of Billets abroad has stiffened the price of the German works in Rods. Here the market remains unchanged at \$37 @ \$37.50 for immediate shipment, and \$36.25 @ \$36.50 for later delivery.

Steel Rail Blooms.—We hear of no business in foreign material, for which we quote \$26.75 @ \$27. Adding freights to interior point and \$6.50 for cost of rolling, including waste, loss on crop ends, heating, &c., it will be seen that this price puts business out of the question. We are informed that the Pennsylvania Steel Company have so much increased their Steel-making and Blooming capacity that they are able to enter the market as sellers of Rail Blooms at the rate of about 1500 tons monthly.

Steel Billets.—We have heard of no business in foreign material recently. We quote \$28 @ \$28.50 for 4-inch. The sale of a lot of 4000 tons of Domestic Blooms at Pittsburgh is reported at \$31.50, thus showing how the advance on foreign stock has allowed American works to secure better prices.

Steel Rails.—We have not heard of any sales of any magnitude for next year's delivery, although in the aggregate considerable business has been placed quietly during the past month. Some authorities estimate the total at more than 100,000 tons, East and West. The market for early delivery remains firm at \$34.50 @ \$35 for round blocks, and \$34 @ \$34.50 for December de-

livery, with \$33.50 @ \$34 for the early months of 1887. There is now and has been for some time past considerable activity in the demand for Steel Rails, notably from a large number of smaller towns all over the country.

Id Rails.—The market has been quiet, little except small sales having been made. Buyers are not ready to pay the prices demanded, and sellers hold firmly. For T's \$22 @ \$22.50, and for Double Heads \$23 @ \$23.50. Buyers' views are \$1 under these figures.

Scrap.—The market is quiet, holders asking \$19 @ \$20.

Rail Fastenings.—We quote 2.15¢ @ 2.25¢ for Spikes, delivered at New York, 1.85¢ @ 1.90¢ for Angle Fish Bars, 2.50¢ @ 2.75¢ for Bolts and Square Nuts, and 3¢ for Bolts and Hexagon Nuts.

Philadelphia.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, September 21, 1886.

Developments during the past two or three weeks have been decidedly favorable to the Iron trade, and it seems now as though continued activity, and perhaps further improvement in prices, might be safely predicted. The large consumers of Iron are nearly all well supplied with orders, and those that are still a little slack have inquiries and negotiations on hand which promise a good share of business in the near future. The Baldwin Locomotive Works, which are regarded as a representative concern, are working up to their fullest capacity, averaging about two locomotives per day; their largest turnout was 25 in two weeks during August. They have orders which will give full employment for several months more, and while prices are very low they report a tendency toward better figures on all new business. The car shops are also full of orders, and, in fact, all the interests connected with railways are fuller of orders than they have been for years past. Other departments report gratifying improvement, so that the consumption of Iron within the next few months is likely to be the greatest in the entire history of the country. The enormous capacity for production keeps prices at a low point, but if the demand is maintained better prices are pretty sure to follow.

Pig Iron.—The demand shows some little improvement, but there is nothing like urgency on the part of buyers. The supply is about equal to requirements, although there is a little scarcity in certain brands, while others are in moderate supply, thus giving the market an appearance of irregularity and uncertainty. On the whole it is probable that the position is better than it was a week ago, due chiefly, however, to the improvement in Finished Iron. Consumption is very large, but the output is sufficient to prevent anything like scarcity, and, besides this, some of the large companies are willing to take orders for next year's delivery at to-day's prices—and, in fact, have done so to some extent—but there is no great anxiety to sell or to buy beyond covering requirements during the next 30 or 60 days. Not because consumers have any doubt as to their requirements, but rather because of the idea that prices are not going much higher, and in any case, if the outlook should change, they expect still to be able to place their orders at pretty near the rates now ruling.

Whether they will be able to do so or not remains to be seen, although there can be no doubt that the position of holders has steadily improved within the past three or four weeks. Prices are not notably higher, but there is more demand and a gradual decrease in competition with cheaper or inferior Irons. There is a slight gain—perhaps 25¢ cents per ton—in seller's favor for No. 1 Foundry Iron, and about the same in good Mill Irons. Sales have been on the basis of \$18.50 @ \$19 at tide for No. 1 Foundry, \$17 @ \$17.25 for No. 2, and \$16 @ \$16.25 for Gray Forge. Everything is well sold up except No. 2, apart from which there is a decided tendency toward better figures. Choice brands command the usual premium of about 1¢ per ton, and are increasingly firm, while as regards lower-priced Irons there is very little for sale at less than the figures asked for standard grades.

Foreign Iron.—There is nothing to report in this line, although prices would probably be a shade easier on firm offers for good-sized lots. Bessemer for shipment offered at \$19 @ \$19.50, and 20 % Spiegel at \$25.50 @ \$25.75.

Blooms.—Quotations on Steel Blooms vary considerably, and are liable to change at any moment. The asking rate for Steel Rail Blooms, duty paid, is from \$26 to \$26.50, but it is not improbable that the lower quotation would be shaded on the right kind of an offer. Nail Slabs have been sold at \$27.50, ex ship, duty paid, and are offered at \$27.75 @ \$28; Sheet-Iron Billets, \$29 @ \$30; higher qualities for Boiler Plate, &c., \$36 @ \$38; Charcoal Blooms, \$50 @ \$52; Run-out Anthracite, \$43 @ \$44; Scrap Blooms, \$34 @ \$35, and Ore Blooms, \$34 @ \$35.

Muck Bars.—There is a very active demand, but the supply is limited, and held at higher figures, say \$29.50 @ \$30 at mill, with several sales at the inside figure.

Bar Iron.—The advance noted last week has been fully maintained, although no large

amount of business has been done at the higher figures. The mills are very full of work, however, with plenty more offered at the old figures, which has been invariably declined. Bids of 1.85¢ for 500-ton lots were made to-day without finding takers at less than 1.9¢ for the class of Iron called for. The position is undoubtedly much improved, and from present appearances there is every reason to expect 1.9¢ @ 2¢ becoming minimum figures for Bars during the balance of the year. Skelp Iron is also firmer and nearly a tenth dearer than it was a week ago. Sellers quote 1.90¢ for Grooved, and 2.25¢ for Sheared, with bids for good-sized lots at 1.85¢ @ 2.20¢.

Plate and Tank Iron.—Under a continued good demand prices have stiffened again and are from 0.05¢ to 0.10¢ dearer on the lower qualities. Some of the mills are having a little trouble with their labor, so that the output is not up to full capacity, although the demand is, or very nearly so. A good deal of business has been placed during the week, however, with a considerable amount of inquiry for lots still to be given out. Prospects are unusually satisfactory from a seller's standpoint, and entire confidence is felt in the following quotations for almost any delivery during the current year: Ordinary Plate, 2.15¢ @ 2.25¢, delivered; Tank, 2.2¢ @ 2.25¢; Shell, 2.5¢; Flange, 3.5¢; Fire-Box, 4.25¢; Steel Plates, Shell, 3.25¢; Flange, 3.5¢; Fire-Box, 4.1¢ @ 5¢.

Structural Iron.—Continued improvement may be reported in this department, both as regards the volume of business and prices realized. A vast amount of work is under contract, while there is a steady influx of a smaller class of orders, which in the aggregate amounts to a considerable business. Consumers of Shaped Iron in all departments appear to be busy, so that there is some difficulty in meeting the demand as promptly as desired. Prices are firmer, and from 0.05¢ @ 0.10¢ dearer on both Angles and Plates, which are now quoted as follows: 2.1¢ @ 2.15¢, delivered, for Angles; 2.2¢ @ 2.25¢ for Bridge Plate; 2.5¢ @ 2.6¢ for Tees, and 3¢ for Beams and Channels.

Sheet Iron.—Business has been somewhat better during the past week, but the absence of demand for Light Sheets is somewhat remarkable, considering the season. Heavy Sheets are quite active, and in this way the mills are kept fully employed. Prices are a shade firmer, and may be quoted about as follows:

Best Refined, Nos. 26, 27 and 28.....	3 3/4
Best Refined, Nos. 18 to 25.....	3 1/2
Common, 1/4¢ less than the above.....	
Best Bloom Sheets, Nos. 26 to 28.....	4 1/2 @ 5
Best Bloom Sheets, Nos. 22 to 25.....	4 1/4 @ 4 1/2
Best Bloom Sheets, Nos. 18 to 21.....	3 3/4 @ 4
Blue Annealed.....	3 1/2 @ 2 3/4
Best Bloom, Galvanized, discount.....	60
Common, discount.....	65

Steel Rails.—The demand is quite up to expectations, and is about as large as can be comfortably handled. Sales have been made at from \$34.50 to \$35 at mill for this year's delivery, and \$34 for 1887. Manufacturers are not urging sales to any great extent, although taking about all the business that is offered to them at the figures above quoted. The outlook continues to be of the most encouraging character, and a large business is considered to be fully assured.

Old Rails.—There is quite an active demand for Old Rails, but the scarcity for spot delivery makes very irregular quotations. As near as can be judged \$21.25 @ \$21.50 would be paid for immediate deliveries, perhaps more for a good lot of Rails, but it is merely guesswork. Two 500-ton lots Mixed T's and Double Heads, prompt shipment by steamer from abroad, sold at \$22, with \$22.25 asked for lots in store. Last sale of T's was at \$21.25 spot, with more wanted at about the same figure.

Scrap Iron.—There is a good demand for almost everything, at about the following quotations: No. 1 Wrought Scrap, \$19 @ \$19.50; Selected do., \$20 @ \$21; No. 2 do., \$13 @ \$14; Turnings, \$14 @ \$14.50; Old Car Wheels, \$15 @ \$16; Old Steel Rails, \$20 @ \$21; Fish Plates in demand at \$24 @ \$25; Cast Scrap, \$14 @ \$15; do. Turnings, \$10 @ \$10.50.

Wrought Iron Pipe.—There is no change to report, the demand being large at steady prices. Discounts as follows: Lap-Welded Black, 55 %; Butt-Welded Black, 42 1/2 %; Butt-Welded Galvanized, 32 1/2 %; Lap-Welded Galvanized, 37 1/2 %; Boiler Tubes, 50 %.

Nails.—There is more business offered than there has been for some time past, but it is difficult to secure full prices, although the tendency is somewhat in favor of sellers. Store lots are nominally \$2.20, but the actual selling price is about \$2.10.

Mr. E. J. Etting, of Philadelphia, has been appointed agent for the sale of the Irondale Iron Foundry and Mill made at the Irondale Furnace, Preston County, W. Va.

Pittsburgh.

Office of The Iron Age, 77 Fourth Avenue, PITTSBURGH, PA., September 21, 1886.

To those satisfied with a regular, legitimate business the outlook continues encouraging. There is a hitch between the Nail manufacturers and the Nail feeders; in consequence the Nail factories are standing idle, but it is thought the matter will be settled before long. With this exception all our manufacturers are in operation, in addition to which natural-gas companies, in

their anxiety to get down all the Pipe possible before the advent of cold weather, are employing about all the men they can obtain. The leading railroads made the discovery some time ago that they did not have sufficient rolling stock to do the business, and they are now very anxious for more cars and locomotives. Unless something unusual turns up in the meantime the probability is that there will be more new railroads in 1887 than this year. There is no place in the country so much interested in railroad improvements as Pittsburgh, as she makes Rails and all kinds of Railroad Supplies. The production of these has been largely increased here within a few years.

Pig Iron.—We have to report a continued active and firm market. Consumers who not long since were buying only as their immediate wants required are now willing to contract ahead, while furnacemen who until quite recently were anxious to contract for future deliveries are now disposed to hold back. However, a good many consumers have succeeded in making contracts to cover their wants for from one to three months, and this being the case it is evident that some of the furnaces will be out of the market for some time to come. It is claimed that sales have been made by furnacemen in the Shenango and Mahoning valleys at an advance of from 25¢ to 50¢ per ton within the past week, and, if so, the furnaces here will no doubt demand a similar advance. Lake Ores have gone up considerably, owing to the sharp advance in Lake freights, and those furnaces having to buy Ores will have to get more money for their product if they expect to come out even. The offerings of Southern Irons have fallen off considerably within the past few weeks, owing, it is said, to an advance in freights, and this, too, has not been without its effect in stiffening this market. We quote as follows:

Neutral Gray Forge.....	\$15.50 @ \$16.00, 4 mos.
White and Mottled.....	14.50 @ 15.00, 4 "
All-Ore Mill.....	16.75 @ 17.00, 4 "
No. 1 Foundry.....	17.50 @ 18.00, 4 "
No. 2 Foundry.....	16.50 @ 17.00, 4 "
All-Ore Foundry.....	18.50 @ 19.00, 4 "
Charcoal Foundry.....	20.00 @ 22.00, 4 "
Cold-Blast Charcoal.....	24.00 @ 27.00, 4 "
Bessemer Iron.....	15.25 @ 15.50, 4 "

Bessemer Iron has stiffened up considerably, and there are now but few sellers under \$18, cash, and it is claimed that some sales have been made at the prices quoted. Included in the sales of Mill Iron made during the week was a lot of 2500 tons for October and November delivery at \$15.25, cash.

Muck Bars.—There is a continued steady demand, and prices are firmer. We repeat former quotations at \$27 @ \$27.50, cash.

Manufactured Iron.—Orders continue to come forward freely, and the mills generally are well employed; some of them are unable to catch up with their business. At no time for several years have mills here been so well employed as at present, and if prices were a little better there would be no cause of complaint. In addition to the regular Merchant-Iron trade there is a good demand for specialties. Mills running on Skelp Iron are all pressed, unable to supply those with whom they have contracts with Iron as rapidly as they desire it. There is also a very good demand for Plate and Tank Iron; a great many new oil tanks are being put up in the various new oil fields; hence there is an increasing call for Tank Iron. There is not so much demand, possibly, for Structural or Bridge Iron, but some of the mills making a specialty of these are pretty well employed on old contracts. Until within the past few months mills using Old Rails were enabled to undersell those using Pig Iron. Within the time specified the situation has changed considerably, and to the advantage of the latter, for while Pig Iron has remained unchanged Old Rails have advanced \$1.50 @ \$2 per ton, and Old Rail consuming mills no longer have the advantage. We continue to quote prices on a basis of 1.65¢ @ 1.70¢ for Bars for assorted orders—that is, for first quality Iron—and 1/4¢ less for poorer qualities.

Nails.—There has been no change in the situation here; the factories continue idle, owing to a hitch between the manufacturers and nailers. The former want the latter to accept the wage scale being paid at Wheeling and other points west of Pittsburgh, to which the latter refuse to accede, and thus the matter stands. It is said that the nailers are willing to accept the scale proposed, but are not permitted to do so by the Amalgamated Association, in whose care they placed themselves some time ago. Manufacturers say that it is impossible for them to pay the present wages scale and meet competition from the East, where skilled labor is much less and the cost of transportation about the same. There are no Nails here, and if the hitch holds out much longer jobbers will be obliged to order Nails elsewhere. Steel Nails are still quoted at Wheeling at \$2, 60 days, 2 % off for cash, in car lots and upward.

Wrought-Iron Pipe.—There is nothing new to note; mills are all just as busy as they can be, none of them able to keep up with their orders, and this may continue until the close of the year. There never was such a demand for Pipe as there has been this year, occasioned mainly by natural-gas and oil developments, and there is no reason apparent at present why it should not continue for several years to come. Prices remain unchanged, but they are firm; discounts are as follows: Black Butt-Welded Pipe, in car lots and upward, 45 %; Galvanized do. 35 %; Black Lap-Welded, 57 1/2 %;

Galvanized do., 40 %. Boiler Tubes, 50 % off; 2-inch Oil-Well Tubing, 14 ¢ per foot, net; 5 1/2-inch Casing, 45 ¢ per foot; 8-inch Drive-Pipe, \$1.30.

Old Rails.—Old Iron Rails continue firm, but so far as we can learn very few sales have been made here of late, the extreme views of holders having a tendency to restrict operations. We quote in the absence of sales at \$23.50 @ \$24. Old Steel Rails also scarce and tending upward; long lengths are now quoted at \$23 @ \$24.

Steel.—There is an increasing demand for all kinds of Bessemer Steel, and prices are firmer, in sympathy with Bessemer Iron. Bessemer Billets and Blooms, \$31 @ \$32; do. Nail Slabs, \$30 @ \$31; Refined Cast T-Steel, 8¢ @ 9¢; Crucible Machinery, 3 1/2¢ @ 4¢; Open Hearths do., 2 1/2¢ @ 2 3/4¢. There are no sales of Crop or Bloom Ends, in the absence of which we omit quotations—none here for sale.

Steel Rails.—The mills are as busy as they can be, and but few of them here or elsewhere can take additional orders for present or near-by delivery. We continue to quote heavy sections at \$36 @ \$36.50, cash, at mill.

Railroad Track Supplies.—There is a continued fair business, but no recent change in prices. Spikes, 2.40¢, 30 days, delivered; Splice Bars, 1.65¢ @ 1.75¢; Track Bolts, 2.75¢ with Square and 2.85¢ @ 3¢ with Hexagon Nuts.

Old Material.—There is a very fair and increasing demand, and prices are firm, being low here as compared with cost at sources of supply. No. 1 Wrought Scrap, \$18 @ \$19, net ton; Wrought Turnings, \$14 @ \$15; Cast Axes, \$23 @ \$24; Cast Borings, \$12 @ \$12.50, gross ton; old Car Wheels, \$16.75 @ \$17, gross; mixed lots Open-Hearth Steel, \$20 @ \$21. There is a good demand for all kinds of Open-Hearth Scrap Steel, and but little to be had, and then only in small lots.

Chicago.

Office of The Iron Age, 36 and 38 Clark St., Cor. Lake St., CHICAGO, September 20, 1886.

An excellent trade is the uniform report of merchants in this city and throughout the West for the last week. It is said that the volume of sales was far ahead of all former years on all classes of merchandise. The heavy shipments of grain have made money plenty in agricultural districts, and consequently collections are easy and cash accounts quite general. Manufacturers of nearly all kinds of goods are working their entire capacity. In Iron stocks this condition of affairs has led to a clamor for higher prices on unfinished material. Foundries and rolling mills are not seeking orders, and yet cannot satisfactorily take care of all coming trade. Ores are scarce, in good demand and up in price. Old material is not abundant, and for some articles abnormally high. Capital seeking new enterprises and the natural growth of the country are the conspicuous causes for this period of activity. The opinion that this revival in trade is healthy and the beginning of an era of prosperity is heralded from every quarter west of the Alleghanies.

Hardware.—The shipping departments of all large jobbing houses have been crowded during the past week with piles of seasonable goods. Elbows, Coal-Hods, Vases and Stove Fixtures were in excellent demand, with considerable increase in the call for Shelf Hardware and Cutlery. The only sensational feature in the trade was the putting forth of a circular by a retail house in this city announcing 25 and 5¢ discount on Granite Ware, under the heading of "Combination Burst." As the price has not been unusual on large orders, and the parties not being members of the combination, the announcement has had no visible effect upon the trade. Jobbers report a steady market and firm prices. Manufacturers are not soliciting orders, and no important changes in discounts have occurred on the general lines of Hardware. Dry Wagon and Carriage wood stocks are scarce and in good demand at prices a shade higher than a month ago.

Barb Wire.—In 500 to 1000 lb. lots the demand for Wire is tolerably good. Jobbers price on such quantities is 3 1/2¢ for Painted and 4¢ for Galvanized. In carload lots they nominally quote 3¢ and 3 1/2¢ respectively. It is said that these prices are shared by manufacturers to 2.90¢ for Painted Wire and 3 1/2¢ for Galvanized in large lots. The market is so badly demoralized that no price can be named that will positively cover the dealings of the entire trade.

Nails.—During the early part of last week jobbers reconsidered their hasty advance made on Nails the Saturday previous, and reduced the price to \$2.10 for Iron Nails and \$2.20 for Steel Nails in small lots from store. During the flurry quite a good many orders were booked at \$2.15 and \$2.25, and some agents instructed to adhere closely to these prices. We understand that jobbers are now allowing a rebate of 5¢ per keg on those orders, and the price uniformly held at \$2.10 and \$2.20 in small lots and in carload lots at \$2.05 for Iron Nails and \$2.15 for Steel, 2 ¢, 60 days, though makers are not soliciting orders and are careful not to take them for delivery very far ahead. We learn that their price, for Chicago, is \$2 for Iron Nails and \$2.10 for Steel Nails, with the usual discount. From private advices obtained from manufact-

urers there is reason to believe that another advance will be made at their meeting this week. The price first named by jobbers last week after more calm deliberation was considered too great, thereby giving opportunity for favoritism, which caused them to reduce the price to a shorter profit and a regular market. It is now their purpose that when a change is made by manufacturers a corresponding change will be immediately adopted by jobbers. There is a brisk trade doing in both classes of Nails. Stocks are not large, but in fairly good assortment.

American Pig Iron.—The feeling which governs the Pig Iron market at present is very different from that of the several past weeks. It was the general impression among dealers that the market had settled down into a quiet period of perhaps 50 days. Trading had actually become dull compared with July and August, but prices remained steady and firm on all Irons and slightly advanced on some of the cheaper grades, notwithstanding the fact that sales had fallen off fully 50%. Buyers during this period were making inquiries and offers, but we hear of no cases in which they were successful in breaking the market. From the results of such efforts buyers were convinced that present prices are the most favorable that can be obtained on Iron for delivery this fall, consequently quite a number of buyers placed large orders during the week, greatly to the surprise of furnacemen and sales agents. In Lake Superior Charcoal Iron all the furnaces tributary to this market, with the exception perhaps of two, have apparently sold so much Iron that they are holding their price at the top quotation, and while there has been no advance there are but few brands that could be bought at the lowest price current during the past month. On some brands which are now selling at prices named there would be an increase of 50¢ per ton for that particular brand without changing the figures at which choice brands have been steadily held during the past four weeks. The quantity of Charcoal Iron has diminished very greatly under the favorable prospects, and other brands are held on a more regular basis. In addition to a good charcoal trade there are buyers in the market for lots ranging from 500 to 2000 tons of Charcoal and Foundry Irons, on portion of which deliveries have been specified to begin with December to March. Upon such orders furnacemen generally are unwilling to quote, but when prices are named the advance ranges from \$1 to \$2 per ton. Lake Superior Charcoal Irons are held with considerable strength at \$19.50 @ \$20, four months, and \$20.50 for choice brands. Coke Irons have stiffened up very much in the last week, though quotations are still held at \$19 @ \$19.50. Buying has not been quite equal to the product on this grade of Iron, and several furnaces which were some time ago inclined to shade this price are now so well sold up that the figures apply on all first-class Coke Irons. Ohio Standard Blackbands are firm at \$19 @ \$20.50, there being but several brands that can be bought below \$19.50, and these only in limited quantities. The most noticeable feature in the market for the week is the increased price demanded for Southern Irons. Furnacemen have shoved up their price from 50¢ to \$1 a ton on all grades, but as the Iron was not saleable here at a lower figure they cannot expect to do an increased business at the advanced price. We quote as present asking prices on Southern No. 1 Foundry \$18; No. 2, \$17 @ \$17.50; No. 2½, \$17; No. 3, \$16.50; No. 1 Mill, \$16, cash, f. o. b. It is said at these figures Hanging Rock and Mahoning Valley Irons have the preference over all brands, almost totally excluding the Iron from the market. The figures are so much out of the range of buyers' views, and sellers are so prescribed in their actions, that sales of importance are very infrequent.

Merchant Steel.—The increased demand for all classes of Iron has stimulated buying among merchants carrying stocks of Bar Steel. The irregularity in trade and weak prices have caused many of them to order only in small lots. Latterly they have begun stocking up, and jobbers note a better business to the retail trade. Railroad orders have been fairly good recently, with prospects of an increased demand from machinery manufacturers. We quote as follows in small lots: Low-grade Tool Steels, 7¢; standard brands, 7½¢ @ 8½¢; Crucible Machinery, Round and Flat, 4½¢ @ 5½¢; Spring Steels, railroad sizes, 4¢; Open-Hearth and Bessemer Steels, 2½¢ @ 3¢; Plow Steels, 4½¢ @ 5¢.

Steel Rails.—The only recent important transaction in the Steel Rail market was the order of the C. B. & Q. Railroad for 20,000 tons placed with the North Chicago Rolling Mill Company for 1887 delivery, contrary to rumor, which had accorded this order to Carnegie. The Rails are to contain 25% Charcoal Iron, and have been contracted for on private terms which would cut no figure in the price of ordinary Rails. While it is yet too early to expect a large demand for next year's delivery, there are nevertheless quite a number of orders seeking makers. There is also a very fair demand for small lots to be delivered this fall which local mills cannot touch. A nominal quotation is \$37.50 for 6 ft quality, and \$34.50 for seconds.

Structural Iron.—With the exception that trade continues to be very good for Slaps from yard, no new features have developed during the week. New buildings

and new bridges which have been on the taps for several weeks have not been settled, but several contracts from distant points that have been held in abeyance for the past month have been closed, for which part of the material will be required this fall. We quote Beams and Channels, combination price, 3 10¢; store price, 3.50¢; Angle Iron, 2.40¢; T Iron, 3¢; Flitch Plates, 2½¢ @ 2¾¢.

Bar Iron.—The advance price established on Bar Iron at the late feast of the jobbers 10 days ago has thus far been well sustained. We understand that buyers have done considerable shopping during the past week for the purpose of breaking the 1.80¢ @ 1.90¢ rates asked on all grades of Merchant Bar Iron without success. While there is undoubtedly a difference in the quality of Old Rail Iron and Best Refined, prices have become so nearly equal from the increased cost of old material that selling at the same price is compulsory. Taking the entire schedule of sizes the scale of Refined Iron is advanced about 5¢, and on Common Iron 10¢ per 100. The number of buyers who will obtain the lower price on the Best Refined grades from store are very limited. All mills quote 1.70¢ rates, but there still exists the feeling that this price would be shaded to 1.65¢ under pardonable circumstances. How well these figures will be maintained depends almost entirely upon the demand. If buyers continue to press their orders upon the market during the next 30 days as they have in the past two weeks, it is generally believed that prices will advance to a 2¢ base rate. All mills in the West are reported full of orders, many of them running night and day.

Galvanized Iron.—There has been a slight falling off in the demand for Galvanized Iron in the jobbing trade. Sales agents have had a fairly good demand from furnacemen and railroads, but have not much call from the jobbing trade. In price the market presents a more regular appearance, mills asking about the same figures for immediate delivery. Jobbers quote Juniata from store 60 and 5¢ off, Charcoal 60, 10 and 5¢ off.

Old Rails.—The scarcity of Old Rails and the eager demand on the part of mills have held the market decidedly firm and added 50¢ to the lowest price named last week, the price now offered being \$22.50 @ \$23. The figures bid, however, do not represent the exact situation, as \$23 has been offered on a lot of from 2000 to 3000 tons and refused, and again it is rumored that sales have been made at \$24 and also at \$25 per ton, but not verified, though obtained from a gentleman in a position to know the exact facts. Rolling mills claim that the conversion of Old Rails into Bar Iron at these figures is impracticable, and, further, that they will be compelled to work new Iron before long unless there is a decline in the price now asked. Old Steel Rails, mixed lengths, are quoted \$19 @ \$19.50; full lengths, \$20 @ \$20.50.

Old Wheels.—The demand for Old Wheels is fairly good at \$15.50 @ \$16, cash. The figures are not satisfactory to parties who have stocks to sell, therefore very few sales have been made. Car-Wheel makers are the principal buyers, and much of the stock that changes hands is done through trading Old for New.

Scrap Iron.—Dealers report an excellent demand for all grades of Scrap from the Ohio Valley, Pittsburgh and all points West. No. 1 Wrought is quoted at \$18 @ \$19; No. 1 Mill, \$15.50; No. 2, \$9.50; Car Axles, \$22; Horse Shoes, \$16.50 @ \$17; Cast Scrap, \$13, net; Stove Plate, \$9; Wrought-Iron Turnings, \$11 @ \$12; Cast Borings, Clean, \$8 @ \$8.50.

Messrs. Forsythe, Hyde & Co. were appointed Northwestern sales agents for the Meta (Hanging Rock Soft) Pig Iron about September 1. The furnace is located at Meta, Ohio, and produces about 300 tons per week.

Birmingham.

BIRMINGHAM, ALA., September 20, 1886.

South Alabama's prospects for this fall and winter are a little damaged by rust in the almost matured cotton crop. Receipts will be cut considerably short, probably below last year's figures. Business is taking on a fall complexion, and promises for the rest of the year are good. This month's business here will hardly equal last month's in volume, but will far exceed any previous September's, and merchants are stocking for a much larger trade throughout the fall and winter than they have ever done before. The coming of new jobbing houses, including one in an important new line, is one of the surface signs of the well-grounded faith in the future of this place as a distributing point. Several things have occurred in the last week to encourage manufacturers. The most noteworthy of these was a visit from several Pennsylvania Iron masters of the Connellsville district, and the submission of propositions and counter propositions between them and owners of Iron properties, some of whose offers they still have under advisement. An event of some consequence is the beginning of work on a belt railroad, which will bring in a good many manufacturing sites at reasonable valuations.

Pig Iron.—There is very little doing in Pig Iron on which to base reports of an ad-

vance of prices. Sales are small and not numerous. Their significance, though, is entirely on the bull side of the market. Better prices are realized in all cases now, and all the business taken is for immediate delivery. No. 1 Foundry Iron is everywhere held at \$15, and No. 2 at \$14 @ \$14.25.

Finished Iron.—The Birmingham Rolling Mills have started up their Sheet mill, which was stopped by an accident some weeks ago, and found a large volume of business on the books awaiting its resumption. There is an active demand for Plates, Bar Iron, Rails and Railroad Fittings.

Cast Pipe.—The Birmingham Iron Works' yard is about cleared of Pipe, and for certain sizes orders are booked considerably ahead. Prices, nominally the same now as six months ago, are stiff.

Miscellaneous.—Good orders are positively going begging from one shop to another. The De Bardeleben Cast Iron Company, the Pioneer Mining and Manufacturing Company and the Sheffield Furnace Company have all found it difficult to get bids here on furnace materials. The manager of one concern, the Sun Iron Works, has declined invitations from all those to make figures. The Linn plant will be practically prevented from taking custom work for a long time, and this fact will increase considerably the present press of work. The Pratt Coal and Iron Company, which own it, will keep it busy for the next two years on their four furnaces and Steel works, one of which they are now in a position to build. It is given out that abundant Eastern capital has been secured for a project that will probably plant several enterprises on favorable sites near the city. The necessary papers have been filed for the incorporation of another promising concern, the Milner & Kettig Iron Works Company, to make Soil-Pipe and Plumbers' Iron Fittings, both cast and malleable, and also to operate an extensive machine shop. Mr. Richard Church, from New York State, has perfected his plans for tool works and machine shop. Several large mining concerns have taken bids for hoisting machinery to equip new openings which they find it necessary to make, and one concern has taken several orders for pumps for the same purpose. The two bridge concerns, the chain works, stove works and gin works all have business booked that would sufficiently employ considerably larger plants.

Chattanooga.

Office of The Iron Age, Carter and Ninth Sts., CHATTANOOGA, September 20, 1886.

Commercial travelers are reporting an unusual degree of activity in their respective lines, and say that merchants as a general thing require but little persuasion to make purchases of respectable bills. In many places in the South minerals, clays and various earths that have long lain dormant are being looked into and thoroughly investigated, and if of any commercial value are being turned to account. The question of railroad building is also receiving much attention. The comparative economy with which roads can now be constructed as compared with a few years ago is an incentive that has caused many local places to reach out and connect themselves with the main lines. Furnace building is now receiving an impetus in the South never before known. Birmingham, Sheffield and Chattanooga are all receiving the benefits of new enterprises in this line, and are each vying with the others as to the natural advantages they possess. Some opinion may be formed of the interest taken in the construction of new furnaces when it is known that there are at the present time no less than 17 new furnaces under construction and companies matured about ready to go to work.

Pig Iron.—The only new feature that has developed in this article since our last report is a disposition on the part of some large consumers to contract for their entire supply for the coming year at prices that are now ruling. This might be a safe thing for the furnace proprietors to do, as it is conceded that most of them are making some money, but as yet no sales of this character have been reported, and the producers are satisfied to enter contracts for two to four months ahead. The very fact that such long contracts on the part of consumers are being offered evidently shows that it is their opinion that Iron will not go lower, and that there is a chance for it to go higher. Coke is still a troublesome factor in this district with the furnace owners, although it would seem unnecessary, situated as the furnaces are almost in the midst of Coal seams. Many minor markets are opening up through Arkansas and Texas by the building of small foundries in some of the towns, and the aggregate sales to these points amount to considerable. Prices remain firm at \$14.50 @ \$15 for No. 1 for large lots, and a corresponding difference of about \$1 as the grades go down.

Miscellaneous.—It is now quite well settled that a new 100-ton furnace will soon be commenced by a local company composed entirely of business men of this place. The stock has all been taken, and work will be commenced as soon as some preliminaries can be gone through with. The completion of the Steel plant of the Roan Company is drawing to an end, and next week will probably see the fires lighted. The ma-

chinery that is being put in the Lookout Iron Company's mill for the purpose of rolling Wrought Pipe is nearing completion, and it is expected to be in operation some time during the coming month.

Cincinnati.

CINCINNATI, September 20, 1886.

Pig Iron.—A most active week has been experienced by dealers, and a strong and confident tone has prevailed. Since our last report Cincinnati has sold upward of 15,000 tons of Pig Iron of different makes and various grades, and about one half of which has been sold in 1000-ton lots. The demand has been well distributed, but there has been rather more inquiry for Mill Iron than at any time since the late activity commenced. Southern furnaces which accepted orders early in the week on a basis of \$16 for No. 2 have withdrawn or will book new business only at an advance of 50¢ per ton. The Ohio and Pennsylvania furnaces were quite free for sellers for a few days, but so active has been the demand that all surplus stocks have been disposed of or are held for higher prices, the Northern stacks in this particular following the lead of the Southern producers. It is evident that consumers have recognized the strength of the situation and have seized the first opportune time to buy, the lull of the past two weeks inviting purchases by watchful and careful buyers. The Pipe works of Newport have this week entered the market, taking 2500 tons, largely Gray Forge Iron. This concern has recently been buying quietly in few hundred ton lots, but doubtless catching the drift of the market secured the round amount just prior to the advance. A few new Southern furnaces are expected to soon commence operations; the capacity of these stacks is comparatively small, from 35 to 40 tons daily, but one will probably make 85 to 100 tons; several old furnaces are also making preparations to blow in. The prospect of an increased production coming upon larger stacks at the furnaces, which is reported, is not flattering, but the developments of the past week prove the statistical position to be much stronger than has heretofore been claimed. The accumulation of Iron at the furnaces last month was probably in preparation for making deliveries upon contracts not then in force, and may also have been due to the difficulty experienced in obtaining cars for transportation, which inconvenience and annoyance has not yet been fully removed. The latest reports are to the effect that Southern furnaces had, toward the end of August, but a two weeks' run on hand. If this be so, the accumulation claimed must have been in other sections which have lately been supplied with such orders as have materially strengthened their views. As to the Iron held upon speculation, there is as yet little apprehension, as the holders of this Iron, having purchased largely on a higher basis than \$16, and having been entailed by carrying charges, are not disposed to market at present, especially as the prospect is bright for higher prices, which will exempt them from loss, if not a profit on the investment. Weak holders have probably been weeded out some time since. Iron made from Lake Ore has been held higher, the advance asked being claimed to cover additional cost of production. Taken all in all the week under review has been the most active of the year thus far, exceeding even the most active periods in July and August. At the present rate of consumption there will be little Iron obtainable except for future delivery. A notable feature of the past week's buying has been the cash sales, or for delivery commencing immediately. It is claimed that Cincinnati distributes annually over 500,000 tons of Pig Iron, and that she has doubled her tonnage of this kind in the past four years. The estimate includes the Iron sold by Cincinnati dealers which is shipped direct from the furnaces to the consuming point; an advantage is thus often secured in freight rates. Encouraging reports concerning the gathering and growing crops of produce are received; the clearing-house exchanges throughout the country continue to show gains over corresponding periods of last year, and railroad earnings are evidently increasing; these facts, together with many minor points, afford an accurate measurement of the business situation. The trade movement takes a fluctuating course, and the Iron interest is one of the prominent and representative branches. Money has been more readily obtainable during the past 10 days here, which doubtless facilitated the activity now recorded in Pig Iron. We quote for cash, f. o. b. cars at Cincinnati, as follows:

Charcoal Foundry
Hanging Rock, No. 1..... \$19.50 @ \$21.00
Hanging Rock, No. 2..... 18.50 @ 20.00
Southern No. 1..... 18.00 @ 19.50
Southern No. 2..... 17.00 @ 18.50

Coal and Coke Foundry.
Ohio Soft Stonecoal, No. 1..... 17.00 @ 17.50
Southern Coke, No. 1..... 15.50 @ 16.50
Southern Coke, No. 2..... 15.00 @ 16.00
Southern Coke, No. 3..... 15.50 @ 16.00
Ohio and West Pennsylvania Coke, No. 1..... 18.50 @ 19.50
Ohio and West Pennsylvania Coke, No. 2..... 17.50 @ 18.00

Forge.
Strong Neutral Coke..... 14.50 @ 15.50
Mottled..... 12.50 @ 14.00
Southern Coke, Cold Short..... 14.00 @ 14.50

Car-Wheel and Malleable Irons.
Southern Car-Wheel..... 21.00 @ 24.00
Hanging Rock, Cold Blast..... 25.00 @ 27.00
Hanging Rock, Warm Blast..... 20.00 @ 22.00
Lake Superior and Malleable..... 22.00 @ 23.00

Manufactured Bar and Sheet Iron.—Foundries and mills as a rule are well supplied with orders, and a firm and confident feeling is manifested by both consumers and sellers of the manufactured product. Common Bar Iron, 1.65¢ @ 1.75¢; Charcoal Bar Iron, 2.65¢ @ 2.75¢; Sheet Iron, Boiled, Nos. 10 to 27, 2¼¢ @ 3¢; Sheet Iron, Charcoal, Nos. 15 to 25, 2¼¢ @ 4¢ per lb.

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Old Rails.—There has been a moderate demand for Rails, but Wheels have been quiet and easy.

Scrap.—For Rails we quote \$21.50 @ \$22.50, and for Wheels \$15.50 @ \$16.

Cleveland.

CLEVELAND, September 20, 1886.

Pig Iron.—A slight advance in prices has been obtained for many lots of Iron sold during the past six days. Buyers in some instances have avoided the increased rates by purchasing Pig Irons of less than standard purity. The transactions for the week were numerous. The ruling quotations in this market are:

Nos. 1 and 2 L. Superior Charcoal..... \$20.50 @ \$21.50
Nos. 3 and 4 Lake Superior..... 21.10 @ 22.00
Nos. 5 and 6 Lake Superior..... 19.50 @ 20.50
No. 1 Strong Foundry, Bessemer quality..... 18.50 @ 19.50
No. 1 American Scotch..... 17.00 @ 18.00
No. 1 Soft Silvery..... 17.00 @ 18.50
Mahoning and Shenango Valley, Neutral Mill Irons..... 15.70 @ 16.70
Mahoning and Shenango Valley, Red Short Mills..... 16.25 @ 17.00

Iron Ore.—The market is very active, although prices have not advanced as anticipated. During the week 16,234 tons were received at the Cleveland docks, exclusive of the 22,481 tons forwarded to inland furnaces. The somewhat high prices for Ores is explained by the fact that lake carrying rates continue at \$2.35 from Ashland, \$1.85 from Marquette and \$1.50 from Escanaba. The condition as to stock piles in this market is not much changed. They are kept sold up as far as most of the companies dare offer. A sale of a 4000-ton lot of Non-Bessemer Hematites at \$4.30 is reported. The local quotations are as follows:

No. 1 Specular and Magnetic Bessemer Ores..... \$6.00 @ \$6.50
No. 1 Specular and Magnetic Non-Bessemer Ores..... 5.50 @ 6.00
Red Hematites, Bessemer quality..... 5.00 @ 5.50
Red Hematites, Non-Bessemer quality..... 4.00 @ 4.75
Menominee Range, Bessemer quality..... 5.50 @ 6.00
Menominee Range, Non-Bessemer quality..... 4.00 @ 4.75
Gogebic Range Ores, Bessemer..... 5.00 @ 5.75
Ores for Mill use..... 5.50 @ 6.00

Old Rails.—The demand is active and prices range from \$22.50 to \$23.75 per ton.

Old Wheels.—Buyers still pay \$17 per ton and will take all the Old Wheels they can get at that price. There is a fair business in all brands of Scrap Iron.

St. Louis.

ROGERS, BROWN & Co., St. Louis, W. H. SHIELDS, manager, report, under date of September 20: There has been some large buying in this market during the week past, and further large transactions are now under way. Last December and January leading St. Louis buyers supplied themselves so fully that new business was light during all the early part of the year. Those contracts, however, are generally running out, and the buyers are again in the field. Some are provided for the remainder of this year, but others still have their purchases to make. They find a stiff market to approach, and the tendency this week seems to be toward greater stiffness. A scarcity of best Foundry Irons is noticed, and with some leading furnaces it is not a question of price, but a complete inability to deliver desirable grades for months to come. Some Southern furnaces that were the lowest sellers two months ago are now at the top in their prices. The new Ohio Irons continue in regular supply, and are going into quite general use. There is a little more disposition on the part of the railroads to sell Old Rails, and a little indifference is shown by buyers of the same, who have been turning their attention to Pig Iron. Foundries and mills and car works are all full of business, and feel greatly encouraged. We quote for cash, f. o. b. St. Louis:

Charcoal Foundry.
Missouri..... \$17.00 @ \$18.00
Southern..... 17.50 @ 18.00

Coal and Coke Foundry.
Southern, No. 1..... 17.00 @ 18.00
Southern, No. 2..... 16.50 @ 17.00
Ohio Softeners..... 17.00 @ 20.00

Missouri Irons.
Missouri..... 15.00 @ 16.50
Southern..... 14.75 @ 15.75

Car-Wheel and Malleable Irons.
Southern..... 20.00 @ 25.00
Lake Superior..... 21.00 @ 23.00

Scrap, etc.
Old Wheels..... 18.00 @ 19.50
Old Rails..... 20.00 @ 21.00
Connellsville Coke (Frick's)..... 5.00

Detroit.

CHARLES HINCH & Co., dealers in Pig Iron, Detroit, Mich., report, under date of September 20, as follows: The market still remains firm, and manufacturers feel confident that there will be an advance before very long. Consumers seem satisfied that prices will not go any lower, and are willing to place orders for their future needs at present prices when they can find a furnace that will make such contracts. There seems to be a scarcity of Southern Coke Iron, and consequently the price asked is higher than it was a month ago. There are very few orders being placed at the advanced price. Silvery Irons from the South are almost entirely shut out from this market on account of the price at which they are held, as Scotch Irons and Jackson County Silvers are used in preference when the prices are the same. There has been considerable inquiry for old material, but few sales reported. For the present we quote as follows:

Lake Superior Charcoal, all numbers..... \$21.50 @ \$22.50
Lake Superior Coke, All Ores..... 20.00 @ 21.00
Lake Superior Coke, Cinder Mixed..... 18.00 @ 19.00
Standard Ohio Blackband..... 20.00 @ 21.00
Southern No. 2..... 17.50 @ 18.50
Southern Silvery, Open..... 17.50 @ 18.50
Southern Silvery, Close..... 16.50 @ 17.50
Jackson County, Ohio, Silvery..... 18.00 @ 19.00
American Old Iron Rails..... 21.00 @ 22.00
Old Wheels..... 18.50 @ 19.50

Trade Report.

General Hardware.

The past week has been an uneventful one, there being few changes in prices, and the demand continuing steady and of good volume. Orders are well assorted, and Builders' Hardware and seasonable goods have a prominent place. Reports from retailers generally indicate a good condition of things throughout the country, with stocks that need frequent replenishing. Collections are fair.

NAILS.

The New York Nail market continues in a very unsatisfactory condition, some sellers showing a disposition to press sales, while the majority of buyers are holding off, content to await developments. We quote \$2 for small lots from store for Iron Nails, the usual concessions being made for carload lots on dock. For Steel Nails \$2.10 to \$2.20 is obtained.

BARB WIRE.

The Barb Wire market tributary to New York continues badly demoralized, and prices, which we may quote 3.85 cents to 3.90 cents, delivered, for Four Point Galvanized Barb Wire, are lower than all but a few of the makers can produce it. Assuming that the Plain Galvanized Wire can be purchased at 3.25 cents, about 60 cents per 100 pounds must be added for the cost of barbing, so that at present prices all outlays for freight, selling costs, &c., represent a dead loss. We note some indications that manufacturers are growing very tired of this way of doing business. Some large orders have been placed for delivery to the Pacific Coast.

MISCELLANEOUS PRICES.

At the meeting of the manufacturers of Wire Nails, held last Thursday at Pittsburgh, it was decided, in view of the low and irregular prices which have prevailed, to make an advance to 50 and 10 per cent. discount. The card rate was fixed at \$3.50. The reports indicated a gratifying increase in the demand for the goods, which are, however, being made at a narrow margin of profit. The fact that the production is already in excess of the requirements of the trade was referred to as the cause of the present low prices, and the probable addition in the near future of a large number of new machines, estimated at nearly 300, was alluded to as not likely to improve the situation.

There is no change for the better in the condition of the Screw market, which is characterized by the low and irregular prices which have been prevailing. The efforts that have been made with a view to some understanding among the leading companies have been thus far resultless.

There is no improvement in quotations on Rules. Most of the manufacturers are selling at extremely low prices, and of late there has been a tendency on the part of some to make lower prices than heretofore, with a view to meeting competition.

The market for Iron Rivets is quite irregular, and the nominal combination rates are very frequently disregarded, as close buyers can in most cases obtain considerable concessions.

The Grain Cradle and Snath Association will soon expire by limitation, and there is at present little prospect of their continuation. At its expiration the manufacturers of these goods will be free to make such prices as they see fit, and the result will probably be lower quotations to the general trade, but with the irregularities that are said to have been practiced, by which the large trade had their orders filled at lower prices than those determined upon by the association, it is not likely that to this class of buyers the goods will be materially lower.

No general advance is announced in Traces, Wagon Chains, &c., but slightly higher quotations are made by some of the manufacturers, and the tendency is toward somewhat better prices. Coil Chain remains without alteration at the low figures that have been prevailing.

The prices of Bright Wire Rods are maintained firmly by the manufacturers, but irregular prices are frequently obtained from the jobbing houses who had purchased before the advance, or who give away more or less of the liberal margin allowed them.

Cast Butts show no special change, but there are indications of a slightly stronger market, and prices are firm.

Manufacturers of common Carriage Bolts are well supplied with orders, and it is hard to get goods promptly. The prices are firmly maintained by the makers, but the many large contracts at the extremely low prices which prevailed before the advance give opportunity for dealers to furnish the goods at concessions of varying extent. The difference between the present prices and that at which the goods were purchased by those who were fortunate enough to have orders in when the advance took place affords a liberal margin for cutting and profit, but holders are not disposed to make very large concessions in view of the firmness of the market.

Tackle Blocks are without further change in price, being held with more or less regularity at the extremely low prices which

have recently prevailed. There is as yet no intimation of any movement toward a re-establishment of prices.

O. B. Wilson, Collinsville, Ill., is putting a line of Stock Bells on the market, which in a general way may be quoted at discount 70 and 10 per cent. from the regular list of the genuine Kentucky Bells.

ITEMS.

The following subscriptions have been made through the Hardware Board of Trade for the relief of the sufferers at Charleston:

ALFRED FIELD & Co.	100.00
HERMAN BOKER & Co.	100.00
BRUCE & COOK	100.00
J. L. MOTT IRON WORKS	100.00
WALLACE & SONS	100.00
MENAB & HARLIN MFG CO.	100.00
SARGENT & CO.	100.00
AUSABLE HORSE NAIL CO.	100.00
RUSSELL & ERWIN MFG. CO.	100.00
JOHN H. GRAHAM & Co.	50.00
J. C. MCCARTY & Co.	50.00
SCHOVERLING, DALY & GALES	50.00
UNDERHILL, CLINCH & Co.	50.00
JOHN G. WITTE & BRO.	50.00
MALBY, HENLEY & Co.	50.00
HOLMES, BOOTH & HAYDENS	50.00
WIEBUSCH & HILGER	50.00
F. & W. CLATWORTHY	25.00
TOWER & LYON	25.00
BATES, WILSON & Co.	25.00
KEARNEY & FOOT CO.	25.00
A. & W. S. CARR CO.	25.00
WATERBURY BRASS CO.	25.00
C. E. JENNINGS & Co.	25.00

Total.....\$1,475.00

As we go to press we regret to learn of the death, yesterday, of S. C. Wilcox, at his home in East Berlin, Conn. Mr. Wilcox was 72 years of age and vice-president of the Peck, Stow & Wilcox Company.

The Nimick & Brittan Mfg. Company, Pittsburgh, Pa., for whom John H. Graham & Co., 113 Chambers street New York, are agents, issue a circular in regard to the numbers designating the finish of their goods. From this it appears that their genuine Bronze goods are finished in 15 styles, their Iron goods in 11, and their Brass goods in five.

The price list of the United States Cartridge Company, Lowell, Mass., is attractively printed, and shows the line of Rim Fire and Central Fire Pistol, Rifle, Military and Sporting Cartridges, Brass and Paper Shot Shells manufactured by them.

The Lansing Wheelbarrow Company, Lansing, Mich., call the attention of the trade to their Luther Patent Stove Truck. The lightness and simplicity of this Truck, the ease with which it is adjusted and the efficiency with which it does its work, as well as the small space it occupies, are points specially alluded to. It is also intimated that a low price as compared with the price of other Trucks will be made.

Brown & Hirth, Pittsburgh, Pa., issue a catalogue describing the line of Guns, Rifles, Revolvers, Gun and Rifle Barrels, Ammunition, Sporting Goods, &c., of which they are manufacturers or dealers. They call attention to the fact that they are the proprietors of the Enterprise Gun and Machine Works, and the only dealers in Pittsburgh or Allegheny County who manufacture their own Gun Barrels, alluding also to the Kentucky Muzzle loading Rifle, which bears their trade-mark. Attention is also called to their repair shops as fitted up with the latest and most improved machinery. The catalogue gives 80 pages of fully illustrated and carefully-arranged matter.

Our readers will observe the announcement on page 16 in regard to the Champion Patent Side Spring of the Penfield Block Company, Lockport, N. Y. The names given of parties handling these Springs will be of interest. The Springs are described as made of the best Swedish steel, oil-tempered. They have, it will be observed, but one leaf in the center, the same as at the ends, and the point is made that, as the body rests on the cross-bars about 11 or 12 inches from the ends of the Springs, they must, when carrying a load, spring in the center the same as at the ends, thus giving more inches of elasticity than are found in other Springs. The ease of riding when they are used is also alluded to, and the claim is made that they will stand more hard driving over all sorts of roads than any other Spring. The manufacturers advise us that they are desirous of securing the address of dealers and manufacturers who are unacquainted with the Champion Spring and its improvements, whom they will take pleasure in informing in regard to them.

One of our subscribers writes as follows in regard to the condition of business, and some of the features of trade as he finds it:

Trade is looking up, as it naturally should at this time of the year, Stoves being the particular article in demand. It is somewhat amusing, but also sad, to see the confused expression upon the faces of husband and wife after making a tour of the Stove stores in search of a heater. They have seen four or more different makes of stoves, both square and round, have heard 12 or 16 prices; heard some Stoves praised, and others defamed; have been told that brass jacket was better than iron; and that iron was better than brass, because nickel would wear better on iron; that flues down the front were better than flues down the back, and many other points which only stove men can show. The tired, bewildered heart-sick pair stumbles

into your store, and are turned over to your salesman, who is eager for the fray, and talks as glibly as if he had not repeated the same things, in the same way, about the same Stoves to 20 people the same day. I say it is sad.

The advanced price on Nails is being adhered to, as far as I can learn. There seems to be no disposition to cut on goods generally—in fact, I do not know that there is any chance to cut.

A Hardwareman inquires for some enamel or coating for the nickel-plating on stoves, and says: "Dealers are often obliged to carry over stoves until the next fall, and obliged in many cases to keep them in cellar, and if kept in dryer places moisture from the hand often leaves a mark of rust. Then people examining stoves on the floor put moist hands on the nickel-work. If the Transparent Enamel referred to by the Hartford Silver Plate Company, or something else, would secure nickel against disfigurement until a fire was put in the stove it would be a great thing for the retailer."

The announcement on page 18 of the auction sale of Cutlery by Haydock & Bissell, on Tuesday and Wednesday, September 28 and 29, at 10 o'clock a. m., deserves the attention of the trade. This sale will comprise a large assortment of Table Cutlery, Carvers and Butchers' Knives, being the balance of the stock of the Bridgeport Knife Company which was on hand at the time of their assignment. Also by order of the manufacturers 12,000 dozen Table Knives, Forks and Carvers. The entire catalogue will be sold without reserve.

The organization of the Kansas City Hardware Company, Kansas City, Mo., is announced, with a paid-up capital of \$125,000. Of this company, T. U. Townsend, formerly of the Springfield Hardware Company, Springfield, Mo., is president; J. A. Bayles, vice-president; W. D. Remoort, secretary, and E. F. Mulholland, treasurer. They purpose doing an extensive jobbing business in the various lines of Hardware, putting a number of traveling men on the road, and are now having erected a five-story double building, which it is expected will be open for business on January 1.

The Steel Nose Trucks manufactured by Byram & Co., Detroit, Mich., besides the feature alluded to in our last issue, are described as made with wheels which are the full size called for in the description of the Trucks. Thus, a 10½-inch wheel is stated to measure 10½ inches, instead of being nominally so, as with some goods on the market.

THE DUTY ON COVERINGS.

The following is the full text of the opinion of Acting Attorney-General Jenckes which has been rendered to Assistant-Secretary Fairchild, as to what coverings on imported goods are dutiable under the various provisions of law, and the decision of the United States Supreme Court in the Oberteuffer case. Complaint had been made by importers that recent rulings of the Treasury Department had been inconsistent with this decision, and were, it is claimed, a practical reversal of it. The whole matter was accordingly referred by Mr. Fairchild to Mr. Jenckes, who has very carefully considered it, as evidenced by the opinion which is given herewith. It will be seen that it gives a more liberal interpretation to the Oberteuffer decision than the Treasury Department has heretofore been disposed to entertain, and that the outcome in all probability will be that nearly all classes of coverings used in good faith for purposes of transportation will be exempt from duty. Though of great importance as regards heavy Hardware articles, the question is one of general interest and has more or less bearing on all imported goods. Mr. Jenckes's opinion rendered to Mr. Fairchild is as follows:

Your communication of the 2d inst. submits for consideration four subjects:

1. "As sacks, boxes and other receptacles which are ordinarily used in the importation of merchandise would, if imported separately, be dutiable under the respective provision of the tariff applicable thereto, the question presents itself whether they lose their dutiable character by being filled with or used for the transportation of such goods."

2. In the case of Oberteuffer vs. Robertson, No. 1102 of October term, 1885, in the Supreme Court, in considering the seventh section of the act of March 3, 1883, the following language is used: "This implied that if the boxes or coverings of any kind are not of material or form designed to evade the duties thereon, and are designed to be used in the bona fide transportation of the goods to the United States, they are not subject to duty." With reference to which you state, "I will thank you for an expression of your opinion as to whether the statement of the Supreme Court, that such coverings are not subject to duty, should be considered as mere dictum used in the process of argument, or as an authoritative expression of the views of the court."

3. "The fourth provision in said Section 7, by which a duty of 100 per cent. ad valorem is authorized in certain cases, as above referred to, is also for your consideration."

4. "The question of the proper interpretation of the proviso in Section 7 is also submitted for your consideration."

The solution of the questions submitted depends upon the true interpretation of the seventh section of the act of March 3, 1883. That section provides: That Section 2907 and 2908 of the Revised Statutes of the United States, and Section 14 of the act entitled "An act to amend the customs revenue laws, and to repeal moiety," approved June 22, 1874, be and the same are hereby repealed, and hereafter none of the charges imposed by said sections, or any

other provisions of existing laws, shall be estimated in ascertaining the value of goods to be imported, nor shall the value of the usual and necessary sacks, crates, boxes or coverings of any kind be estimated as part of their value in determining the amount of duties for which they are liable. Provided, that if any packages, sacks, crates, boxes or coverings of any kind shall be of any material or form designed to evade duties thereon, or designed for use otherwise than in the bona fide transportation of goods to the United States, the same shall be subject to a duty of 100 per cent. ad valorem upon the actual value of the same." By this section whatever in Sections 2907 and 2908 of the Revised Statutes, and the 14th section of the act of June 22, 1874, was included as charges is excluded from the estimate in fixing the dutiable value of the goods to be imported.

The three sections repealed by the section quoted embrace as charges "the cost of transportation, shipment and transshipment, with all expenses included, from the place of growth, production or manufacture, whether by land or water, to the vessel in which shipment is made to the United States; the value of the sack, box or covering of any kind in which merchandise is contained, commission at the usual rate, but in no case less than 2½ per centum, and brokerage, export duties, and all other actual or usual charges for putting, preparing and packing for transportation or shipment." When these charges are excluded, "the goods to be imported are left to be valued at the actual market value, or wholesale price thereof, at the period of the exportation to the United States, in the principal markets of the country from which the same have been exported." Taken in connection with the provisions of Section 2906, Revised Statutes, which remains unrepealed, the effect of Section 7 of the act of the 3d of March, 1883, is to make the dutiable value the same as "the actual and market value or wholesale price" in the principal markets of the country from which the goods were exported at the time of the exportation. Hence the market value of the goods to be imported, as above stated, as the law now stands, is identical with the dutiable value; nor can any of the charges above stated be added to that value for the purpose of charging duties thereon. Sacks, boxes and coverings of any kind in which merchandise is contained are embraced among the charges which are not to be included with the value of the goods. As the statute in the broadest terms excludes all these, it is not permissible to add to its terms either the words "inside" or "outside." The exemption extends alike, and with equal force, to both inside and outside sacks, boxes or coverings of the merchandise. But the same sacks, boxes or coverings, if imported separately, would be subject to duty. The inquiry arises whether each is not to be charged with a duty, when used as the covering to other dutiable merchandise, as though separately imported? Did the legislative power so extend it? The Revenue act of 1883, of which Section 7 is a part, was intended to reduce the revenue of the Government, which had become excessive. To reduce taxation on imports was the means adopted. The increased dutiable value of the importations occasioned by adding the value of coverings, &c., under Section 2907, if stricken off entirely, would be a large reduction, but if the coverings were only to be separated for purposes of duty from the value of the goods and then taxed at separate rates, whether such a measure would increase or decrease the actual tax would be very uncertain. It is unlikely Congress would intend a reduction and pass an act which was subject to such uncertainty as to results. Simplicity in administration is an important element of a judicious tax bill. The collection of duties under Section 2907, which was repealed, would be more easily administered than under the act of 1883, if the duties on the coverings were only intended to be changed as to rates to be levied. The coverings were not by former laws subject to taxation except as charges on the goods imported; yet under the former law they would have been liable to taxation if imported separately. The mere repeal of the charge cannot be considered as an enactment of a duty on that which before the repeal would not have been subject to duty. The proviso to the section under consideration suggests beyond mistake that a separate levy of the duty repealed was not contemplated by Congress. That proviso is "that if any packages, sacks, crates, boxes or coverings of any kind shall be of any material or form designed to evade duties thereon, or designed for use otherwise than in the bona fide transportation of goods to the United States, the same shall be subject to a duty of 100 per cent. upon the actual value of the same." If the same tax was intended to be imposed upon a given article, whether it was used as a covering for other goods or imported separately, it is not possible that Congress would have imposed a penalty for an evasion which, under such an interpretation of the law, could not occur; but if when used as a covering it came in free from duty, and when separately imported was subject to duty, there would be a temptation for a colorable and fraudulent use as a covering in order to evade duty. The proviso was intended to prevent such an evasion. That the charges repealed by this section are not subject to a separate tax is distinctly ruled in the case of Oberteuffer vs. Robertson, in the following language, as quoted in your letter: "This implies that if the boxes or coverings of any kind are not of a material or form designed to evade duties thereon, and are designed to be used in the bona fide transportation of the goods to the United States, they are not subject to duty." That this is not dictum is well established by the fact that it is a distinct answer to what the court in the opening of the opinion says is the main point in the case, as follows:

"The main question left in the case is whether it was lawful to impose duties on the items for boxes and packing in the invoices on the two cases and the 37 cases and on the items added to the invoices of the one case, which item was one for like boxes and packing."

The brief submitted in the case by Solicitor General Gode on the part of the Government declares:

"It will be seen that the plaintiff's protest stated substantially but a single ground of objection to the collector's liquidation, which was that the cartons were not liable to duty."

The court again, after a discussion of an objection raised by the Solicitor-General that the plaintiffs in the case had mistaken their remedy, in that they had not demanded a reappraisal under Section 2930, rules the objection not well founded, and concludes the discussion of this branch of the subject by saying:

"The exaction of the duty on the packing, whether packing goods in a carton, or the cartons in the outer case, or lining the outer case, was not warranted by law."

Hence it would seem the very subject was distinctly before the court, considered by it as essential to a proper decision of the case, was formally ruled upon, and thus became an authoritative interpretation of the section under consideration. But while Section 7 does not permit a separate assessment of the boxes, coverings, &c., nor an assessment as part of the value of the goods, in order that this freedom from duty may not be fraudulently or wrongfully used to import dutiable goods free, the proviso of the section was added by which a penalty of 100 per centum ad valorem is imposed whenever such an invasion is attempted. This penalty is only incurred, first, when the coverings, &c., "shall be of any material or form designed to evade duties thereon;" second, "when designed for use otherwise than in the bona fide transportation of the goods to the United States." The first cause for the imposition of the penalty commits to the officer charged with the administration of the law the duty of determining from the character, value, form and material whether the purpose and design of the covering was an evasion of duty or a good faith covering. If the covering in either material or form is unusual and dutiable under other provisions of law, he is allowed to infer, when its character is thus extraordinary, that evasion is designed. The second ground for the imposition of the penalty requires the officer to determine whether the covering was designed, at the time of its application to that use, to be used again for the same or some other use of substantial commercial value, for which, if separately imported, it would be subject to duty, or whether its utility will be substantially exhausted as soon as it shall have subserved the use to which as a covering it is then devoted. In the former event the penalty of 100 per cent. should be collected. In the latter it should not. The mere fact that it is continued after importation as a covering for the same merchandise calls for no penalty.

The law does not contemplate that as soon as the merchandise reaches the port and pays the duty it shall then be denuded and new covering, either inside or outside, be provided to protect it either in handling or sale; neither is there any time nor place after the importation that the same covering, used for the same merchandise, as covering, from which or in which to make sale of the merchandise, would show that it was designed for use for importation, so as to subject the covering to a duty at the rate imposed as a penalty in the proviso; nor would the fact that a box might possibly afterward be used for fuel, or the covering for some other use, subject the box or covering to a penalty unless there is reason to believe such use was designed and contemplated at or before the time of importation. From this general consideration of the subject the conclusions follow:

1. That the sacks, boxes and coverings of any kind, the duty on which was repealed as charges by the seventh section of the act of March 3, 1883, are not subject to duty, neither as a part of the value of the goods, nor separately, except when they come under the proviso to that section or some special provision of law.

2. That the portion of the opinion in the case of Oberteuffer vs. Robertson quoted in your letter is not dictum, but an authoritative interpretation of the law on the subject referred to therein.

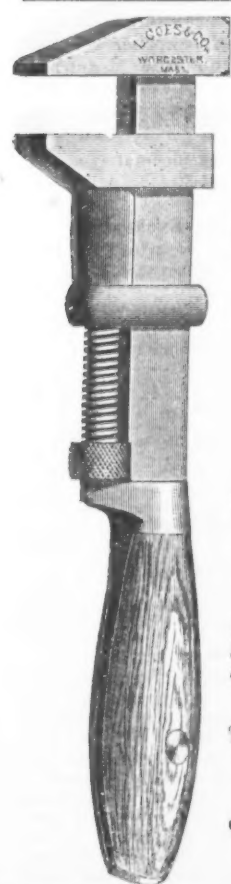
3. That the 100 per cent. ad valorem can be imposed upon coverings only when their material or form justifies the conclusion that they were used as such to evade duties, or when they were designed or contemplated to be applied to some use other than that of coverings for transportation to the United States of the merchandise they then inclose, even though that use as a covering only should continue after the goods had passed beyond the custom-house to a market or consumer.

4. The mere fact that the boxes, sacks, crates or coverings of any kind might possibly be used after importation for other uses, if such uses were not designed at or before the time of importation, and there was not at the time a design to evade duty by their use as coverings, will not subject such coverings to 100 per cent. duty prescribed as a penalty.

The 100 per cent. duty in the proviso, although not in terms a penalty, is an unusually high duty. The section under consideration clearly excludes the coverings from valuation as a part of the goods. The second element in the proviso to the section implies no turpitude on the part of the importer. In balanced cases in a customs act the doubt is to be resolved in favor of the importer. Hence, although the coverings, after the port is reached, might by a literal interpretation be construed, if intended for use after as a cover to the same goods, to be designed "for use otherwise than in the bona fide transportation of goods to the United States," yet such an interpretation, while within the letter, would be a violation of the spirit of the act.

Mr. Richard T. Barton, who is an employee of Andrew M. Smith, manufacturer of sewing machine needles, of New Haven, Conn., has invented a machine for straightening bar iron used for the manufacture of cold punched nuts. He has received a patent for it, dated August 10, 1886, No. 346,884, which he has assigned to Andrew M. Smith and to G. H. Allen of Hamden, Conn. It consists of a flanged drum driven by gear-

9. 2 pig in one hour in an experimental furnace costing less than \$50.



L. COES'
GENUINE IMPROVED
Knife Handle
PATENT
Screw Wrenches

MANUFACTURED BY
L. COES & CO.,
Worcester, Mass.
ESTABLISHED IN 1839.

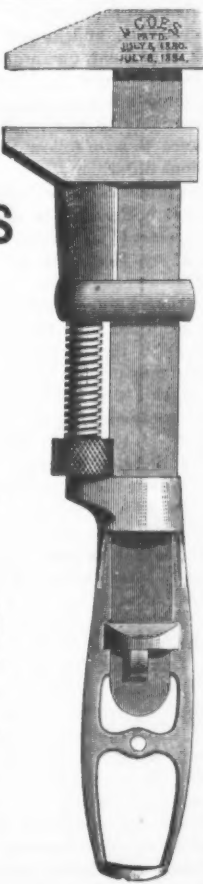


Sectional view illustrates our NEW
KNIFE HANDLE, showing Malleable
Iron Frame and Shank of Bar keyed
into position.
Straight Bar, Extra LONG NUT
FOR SCREW IN JAW.

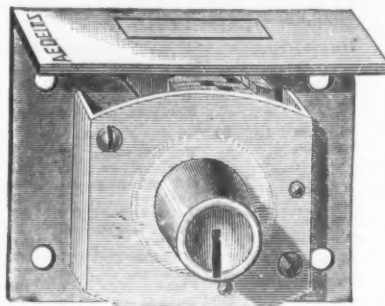
The Best Made and Strongest Wrench in the Market.
Send for Illustrated Price List and Circular.

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Sole Agents.



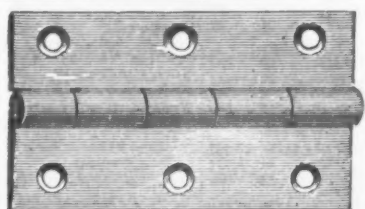
A. E. DEITZ.



No. 51 Lock.

J. C. McCARTY & CO., Agents,
97 Chambers and 81 Reade Sts.,
NEW YORK.

Factory, BROOKLYN, F. D., N. Y.



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ALWAYS GIVES THE
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Main Belting Co.
Manufacturers of
THE LEVIATHAN
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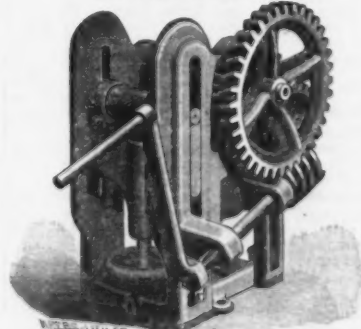
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Unsurpassed for
Strength, Durability and
Cheapness.
Made to any Length,
Width and Strength.
Main Driving Belts.
Guaranteed to Run
Straight, Even Through-
out.
No Cross Joints, Un-
affected by Damp,
Clings well to the Pulley,
Has no equal. In fact,
is THE BELT.

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COMPANY,**

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Sts., Philadelphia.
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The Strongest and Most Powerful
TIRE BENDER
IN THE WORLD.



This is the only Tire Bender Geared with a Worm-
the strongest and most powerful Tire Bender made,
giving it a regular and easy motion, allowing no slip-
ping of the tire or backward strain on the crank or
operator. We guarantee it to bend from the smallest
tire to 4 x 1 in. with comparative ease. The tire is
easily removed by drawing the centre roll straight
out from the worm. The two end rolls are supplied
with wrought-iron collars, in order to keep the tire
from warping. The size of the tire is adjusted by a
screw, enabling it to bend from a FIFTH WHEEL to the
largest size. In no instance is it fully up to the
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Portable Forges.

Weight, 235 lbs.
THE CHAMPION BLOWER AND FORGE CO.,
LANCASTER, PA., U. S. A.

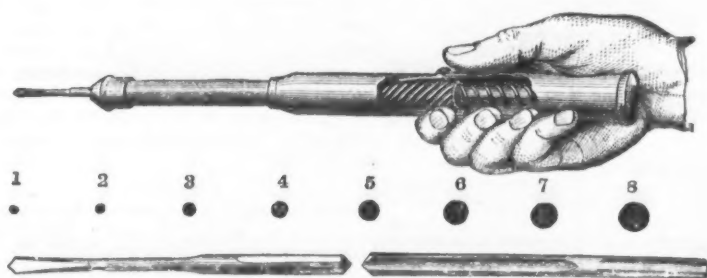
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The Best in the World.
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Printer.**
TYPE SETTING, etc.
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money making. For old or
young. Send 3 stamps for
Catalogue of Presses, Type,
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W. H. SEY & CO.
Meriden, Conn.

Johnson's Automatic Boring Tool.

New List and Increased Discount.



From this date the list on these Tools com-
plete with eight drills will be \$24.00 per doz.,
instead of \$27.00, as heretofore. The discount
to dealers will be quoted on application.

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September 15th, 1886.

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Forged Horse Nails.
MANUFACTURED BY THE
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HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST
NORWAY IRON AND WARRANTED.
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J. B. SEIDEL, President. **W. HASTINGS,** Vice-Pres. and Gen'l Mgr. **E. T. CANBY,** Sec. and Treas.

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**BEST CHARCOAL
BOILER PLATES,**
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ALSO BEST QUALITY HOMOGENEOUS STEEL PLATES.

We ask the special attention of the trade to our U. S. No. 1 Boiler Plates, which we
manufacture expressly for the Shells of Steam Boilers and stamp 50,000 pounds T. S. when
desired. One hundred and sixteen tests of this iron, made during the last three years by the
U. S. Inspectors of Steam Vessels, show an average tensile strength of 56,808
pounds to the sectional square inch, and an average reduction of area of the fractured
section of 30% per centum. Our prices are as low as the production of a good article will admit of.

POTTSVILLE IRON & STEEL CO.,
POTTSVILLE, PA., Manufacturers of all kinds of
STRUCTURAL STEEL AND IRON,
Viz., BEAMS, CHANNELS, TEES, ANGLES, PLATES AND BARS; Also STEEL
AND IRON AXLES FOR FREIGHT AND PASSENGER CARS.

This Steel is manufactured by the CLAPP-GRIFFITHS process, and is specially adapted, in
addition to the above, for Boiler and Bridge Rivets, Wire Rods, Nail Plates, &c. &c. Our Mild Steel
is well adapted for use in place of the best quality of Wrought Iron; where a greater strength
and ductility is required, it welds readily as iron. Also Billets, Slabs of all sizes and any desired
temper. Shipment of all sizes in stock, from which prompt shipments can be made.

Brewery, Malt and Ice House Construction a Specialty.

Herrman-Parker Hardware Mfg. Co.,

MANUFACTURERS OF

GREY IRON SHELF HARDWARE.

Our Specialties: Axle Pulleys, Well Wheels, Grind-
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Handles, Stove Lifters and Post Mauls.

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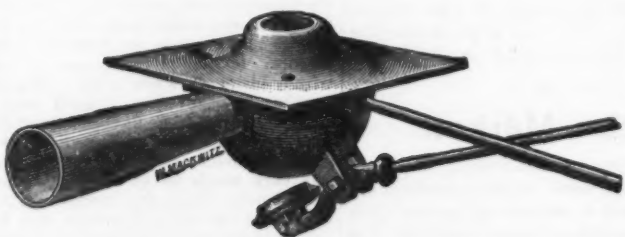
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Jack Screws, Tire Benders, Track Jacks,
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SAD IRONS. COPYING PRESSES AND STANDS, &c.

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ONLY PERFECT ADJUSTABLE

Sliding Door Hangers,

ONLY PERFECT

TRANSOM LIFTER,

ADJUSTABLE SAW VISES, SPOKE
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EXCELSIOR CAN OPENERS,

Patent Braided Cotton
CHALK LINES, &c.

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**LLOYD & SUPPLEE
HARDWARE CO.,**
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Parlor Door Hanger.

"FLORENCE"
LAMP STOVE.



Well Advertised,
Sells Quick and
Pleases Everybody.

Why not try them?

**The ALFORD &
BERKELE CO.**

Selling Agents,

Pat. Nov. 14, 1876, & July 11, 1882. Others Pending.

77 Chambers St., New York.

J. H. Sternbergh, Reading, Pa.,
MANUFACTURER OF
REFINED BAR IRON.

Also as a Specialty

Bolts, Nuts, Washers, Rivets.
LAG SCREWS, TURNBUCKLES,
Rods and Forgings for Bridges and Buildings,
&c., &c.

ORE JIGS.

The attention of Hematite ore miners is called
to our new Jig. The simplest and most effective
separator now in use.

McLANAHAN & STONE,

Gaysport Foundry, Hollidaysburg, Pa.

Manufacturers of Ore Washers, Screens, Elevators,
Conveyors, and general Ore Mining Machinery.

MECHANICAL.

Jet Propellers.

In an article on hydraulic propulsion the *Engineer* (English) thus reviews the relative positions of jet and screw propellers:

When a screw or paddle-wheel is put in motion a body of water is driven astern and the ship is driven ahead. Water, from its excessive mobility, is incapable of giving any resistance to the screw or paddle save that due to its inertia. If, for example, we conceive of the existence of a sea without any inertia, then we can readily understand that the water composing such a sea would offer no resistance to being pushed astern by paddle or screw. When a gun is fired the weapon moves in one direction—this is called its recoil—while the shot moves in another direction. The same principle operates to cause the movement of a ship. The water is driven in one direction, the ship in another. Professor Rankine has laid down the proposition that, other things being equal, that propeller must be most efficient which sends the largest quantity of water astern at the lowest speed. This is a very important proposition, and it should be fully grasped and understood in all its bearings. The reason why of it is very simple. Returning for a moment to our gun we see that a certain amount of work is done on it in causing it to recoil, but the whole of the work done by the powder is, other things being equal, a constant quantity. The sum of the work done on the shot and on the gun in causing their motions is equal to the energy expended by the powder; consequently the more work we do on the gun the less is available for the shot. It can be shown that, if the gun weighed no more than the shot, when the charge was ignited the gun and the shot would proceed in opposite directions at similar velocities—very much less than that which the shot would have had had the gun been held fast, and very much greater than the gun would have had if its weight were, as is usually the case, much in excess of that of the shot. In like manner part of the work of a steam engine is done in driving the ship ahead and part in pushing the water astern. An increase in the weight of water is equivalent to an augmentation in the weight of our gun and its carriage of all that, in short, takes part in the recoil.

But, it will be urged, it is just the same thing to drive a large body of water astern at a slow speed as a small body at a high speed. This is the favorite fallacy of the advocates of hydraulic propulsion. The turbine or centrifugal pump put into the ship drives astern through the nozzles at each side a comparatively small body of water at a very high velocity. In some early experiments we believe that a velocity of 88 feet per second, or 60 miles an hour, was maintained. A screw propeller operating with an enormously larger blade area than any pump can have drives astern at very low speed a vast weight of water at every revolution; therefore, unless it can be shown that the result is the same whether we use high speed and small quantities or low speed and large quantities, the case of the hydraulic propeller is hopeless. But this cannot be done. It is a fact, on the contrary, that the work wasted on the water increases in a very rapid ratio with its speed. The work stored up in the moving water is expressed in foot-pounds by the formula $\frac{Wv^2}{2g}$, where W stands for the weight

of the water and v for its velocity. But the work stored in the water must have been derived from the engine; consequently the waste of engine power augments, not in the ratio of the speed of the water, but in the ratio of the square of its speed. Thus, if a screw sends 100 tons per second of water astern at a speed of 10 feet per second, the work wasted will be 160 foot-tons per second in round numbers. If a hydraulic propeller sent 10 tons per second astern at 100 feet per second, the work done on it would be 1562 foot-tons per second, or 10 times as much. But the reaction effort or thrust on the ship would be the same in both cases. The waste of energy would under such circumstances be 10 times as great with the hydraulic propeller as with the screw. In other words, the ship would be magnified in that proportion. Of course it will be understood that we are not taking into account resistances and defects proper to the screw, from which hydraulic propulsion is free; nor are we considering certain drawbacks to the efficiency of the hydraulic propeller from which the screw is exempt; all that we are dealing with is the waste of power in the shape of work done in moving water astern, which we do not want to move, but cannot help moving. If our readers have followed us so far they will now understand the bearing of Rankine's proposition, that that propeller is best which moves the greatest quantity of water astern at the slowest speed. The weight of water moved is one factor of the thrust, and consequently the greater that weight, other things being equal, the greater the propelling force brought to bear on the ship.

It may be urged, and with propriety, that the results obtained in practice with the jet propeller are more favorable than our reasoning would indicate as possible; but it will be seen that we have taken no notice of conditions which seriously effect the performance of a screw. There is no doubt that it puts water in motion not astern. It twists it up in a rope, so to speak. Its skin frictional resistance is very great. In a word, in comparing the hydraulic system with the normal system, we are comparing two very imperfect things together; but the fact remains, and applies up to a certain point, that the hydraulic propeller must be very inefficient, because it, of all propellers, drives the smallest quantity of water astern at the highest velocity.

There is, moreover, another and a very serious defect in the hydraulic propeller as usually made, which is that every ton of water passed through it has the velocity of the ship herself suddenly imparted to it. That is to say, the ship has to drag water with her. To illustrate our meaning, let us suppose that a canal boat passes below a stage or platform a mile long, on which are arranged a series of sacks of corn. Let it further be supposed that as the canal boat

passes along the platform at a speed of, say, 5 miles an hour, one sack shall be dropped into the boat and another dropped overboard continuously. It is evident that each sack, while it remains in the boat, will have a speed the same as that of the boat, though it had none before. Work consequently is done on each sack, in overcoming its inertia by imparting a velocity of 5 miles an hour to it, and all this work must be done by the horse towing on the bank. In like manner the hydraulic propeller boat is continually taking in tons of water, imparting her own velocity to them, and then throwing them overboard. The loss of efficiency from this source may become enormous. So great, indeed, is the resistance due to this cause that it precludes the notion of anything like high speeds being attained. We do not mean to assert that a moderate degree of efficiency may not be got from hydraulic propulsion, but it can only be had by making the quantity of water sent astern as great as possible and its velocity as small as possible. That is to say, very large nozzles must be employed. Again, provision will have to be made for sending the water through the propeller in such a way that it shall have as little as possible of the motion of the ship imparted to it. But as soon as we begin to reduce these principles to practice it will be seen that we get something very like a paddle-wheel hung in the middle of the boat and working through an aperture in her hull, or else a screw propeller put into a tube traversing her from stem to stern.

We may sum up by saying that the hydraulic propeller is less efficient than the screw, because it does more work on the water and less on the boat, and that the boat in turn does more work on the water than does one propelled by a screw, because she has to take in thousands of tons per hour and impart to them a velocity equal to her own. Part of this work is got back again in a way sufficiently obvious, but not all. If it were all wasted the efficiency of the hydraulic propeller would be so low that nothing would be heard about it, and we certainly should not have written this article.

Hydraulic Attachments to Sugar Mills.

In a paper read before the British Association at its late meeting Mr. Duncan Stewart described an interesting hydraulic attachment to sugar mills. The novelty consisted of the brasses of the rolls being attached to hydraulic rams. In this way a provision was made for the rolls giving somewhat if any foreign hard substance, which would otherwise break the machine, should get introduced. By this arrangement the percentage of juice can be extracted equally from all the canes passing through the mill, whether the feeding be regular or not. It also lends itself to mechanical feeding, a system not yet successfully introduced. It will work with such regularity that the crushed canes, known as "megass," may be used as fuel at once. The saving by use of this system is calculated at \$5 per ton of sugar made. We understand that it is now at work in more than 50 sugar factories.

Band vs. Circular Saws.

Band saws, says the *Timberman*, are probably the coming machines for making lumber where great economy of raw material is the thing to be most carefully considered. The experiments made, and the practical use of these implements during the last two or three years, demonstrate this much beyond any question. But because this is true it does not follow that circular saws are to become obsolete. They have made too good a record to be disposed of so summarily. There is no good reason for believing that circular saws will not be in great demand for many years to come, if they do not occupy a prominent place in the list of lumber-cutting tools as long as there is lumber to be cut. Both the band and circular represent developments of the same principle; they both accomplish their work by means of a serrated blade moving rapidly in one direction, therein differing radically from the principle of the earliest sawing machinery—that of a reciprocating movement—the highest development of which is seen in the modern gang. So handy, effective, reliable and cheap an application of the principle of a continuously-moving blade as is found in the circular saw cannot give way entirely to any improvement, however economical of timber it may be. For very many situations the circular mill, of low first cost, adapted to more or less rough usage, not easily got out of repair, rapid in its work, and altogether a reliable device, is better fitted than would be the most perfect band machine, though it might cut a kerf no thicker than a sheet of paper. The fact that there are so many places of this kind that can be better filled with a circular mill than with any other sort of lumber-cutting arrangement insures for it a demand and popularity that will not be perceptibly reduced by the encroachments of the band saw upon its domains. Indeed, it is possible that improvements may still be made in circular saws that will bring it close alongside the band in point of economy. Astonishing success has been achieved already in the use of thin saws, and who will venture to fix the limit beyond which improvement in this direction shall not go.

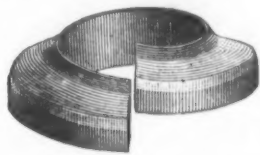
A New Nut Lock.

Of the almost endless variety of nut locks thus far brought out there is probably none better designed to secure the desired object than the device shown in the annexed cut. It is known as the National Lock Washer, and combines all the important features of efficiency, simplicity and low cost.

Its general character will perhaps be best understood from a brief description of the manner in which it is manufactured. The raw material is in the shape of a thin steel rod of rectangular section rolled with a slight rib at one side. This rod is coiled upon a mandrel placed in a lathe, and the coil and mandrel together are then mounted on a milling machine provided with suitable cutters by means of which a longitudinal slot is cut the entire length of the coil. The resulting product is a number of washers of the shape shown in the engraving. The washers after having been subjected to a tempering process are

placed in a tumbling box, from which finally they emerge ready for the market. The action of one of these washers in securing a nut is at once apparent. As the nut is screwed down the rib on the washer, to which we have already referred, causes a flow of metal in the nut, the metal being forced against the bolt, completely filling up the spaces between the threads. In this way a remarkably tight fit is secured. At the same time the washer, when forced down so as to bring its two ends opposite each other, presents to the surface beneath it a concave face, causing the washer to yield to any further pressure of the nut, and thus adding materially to the spring already given by the process of cooling. The tendency of the reaction of the washer on the nut thus obviously is to constantly tighten the fit between nut and bolt.

For use upon fish plates on railways, upon harvesting machines and in many other places a nut-locking device of this kind is of inestimable value, and we understand that the washer which we illustrate has al-



The National Lock Washer.

ready given highly satisfactory results. Several washers of this type have been used experimentally on the track of the Pennsylvania Railroad during the past few months, and the experience with them has shown them to be thoroughly reliable. The New York Central and Hudson River Railroad Company, we are informed, have recently ordered 72,000 of these washers, which certainly seems to indicate that the device is meeting the favor of railroad authorities.

It is made by the National Lock Washer Company, 52 Lawrence street, Newark, N. J.

English Portable Engines.

Theoretical men, says the *Mechanical World* (England), have for years been urging our agricultural engineers to go in for a high speed, high-pressure and light portable engine, but without avail. One of the first questions generally asked by engineers who have had little or no practical experience is, "Why are portable engines made so heavy?" Our foreign competitors, we are told, are making for themselves a lighter type of portable engine. There are also some agricultural engineers who agree that the modern English portable engine is much too heavy. In the face of such testimony in favor of a lighter style of engine it does appear somewhat surprising that these engines are now heavier than ever they were.

Twenty five or 30 years ago an 8-horse-power nominal portable engine was worked as a general rule, at 45-pound boiler pressure, at a speed of 100 revolutions per minute, and the engine weighed not more than 60 cwt. The present 8-horse portable engine is worked at 80 to 100 pounds pressure per square inch, and at a speed of 150 revolutions per minute, and weighs over 80 cwt. The working pressure has been doubled and the speed has been materially increased, and, in opposition to the general supposition, the weight has not decreased, but increased 25 per cent., this enormous weight having gradually, year by year, crept up to the present limit. The long-established firms of world-wide renown continue to manufacture heavy engines in spite of the dictates of theorists and journalists; and every new maker of portable engines, instead of leaving the beaten track and yielding to the popular demand by introducing a 50 per cent. lighter and cheaper portable engine, invariably heaps the material on to such an extent, probably to gain favor with buyers, that the new designs recently introduced have outweighed the already prodigious well-known types. Are our agricultural engineers unable to design and make a light portable engine? We think not, but as soon as they discern a genuine demand for a high-speed, high-pressure and lighter type of portable engine they are prepared to introduce one to supply the need. Until such a demand arises we may employ our time profitably in showing that it is much easier to theorize about light portable engines than it is to make them; and we may safely add that it is infinitely easier to make them than it is to sell them. Our contemporary, however, says "that the sale might be trebled," but we fear that he would soon change his opinion if we could prevail upon him to turn salesman for a year or two. Doubtless some of those firms who are short of work would offer a liberal commission to any one who would guarantee to effect anything like a trebled sale.

English buyers fight shy of small engines, and as a rule take care to have plenty for their money, and at the present time will only give their order to the maker who offers the largest cylinder capacity and the greatest amount of heating surface in the boiler. During the present depressed state of trade the buyers repeatedly stipulate the sizes of cylinders, &c., choosing the maximum proportions of the various firms who may have forwarded specifications and tendered for the work. If one customer imagines that his boiler is $\frac{1}{2}$ inch less in diameter than his neighbor's, who possesses one of the same nominal horse-power, the salesman soon hears about it, and believes he will never hear the last of it. Our experience also teaches us that machinery purchasers do not object to the use of high steam pressure, and they take very kindly to quick speeds, providing that these advantageous features are added to a good sized engine; but as soon as speed and pressure are adopted for the purpose of making a material reduction in the dimensions of the motor (unless the price is more than proportionately reduced, which we are prepared to show that it cannot be), then your would-be purchaser soon takes a return ticket, and quickly finds a heavier engine in another market exactly suited to his taste. This hardly looks like trebling the sales. Our contemporary has assumed that the engine buyer would not be so unbusiness-like as to hurry off in this fashion, but, on the contrary, to show his appreciation of the design he graciously purchases three light engines when he only requires one. We are prepared to admit that the ordinary portable engine may be reduced in weight without impairing its efficiency, but we feel certain that this reduction could not safely exceed 25 per cent. Supposing for the moment that the weight of an 8-horse portable engine may be reduced from 80 cwt. to 60 cwt., but the price, unfortunately, could not be reduced in the same ratio.

For instance, the details of a certain engine, which do admirably for 80-pound boiler pressure and 150 revolutions per minute, would utterly fail were a pressure of 200 pounds per square inch and a speed of 220 revolutions per minute introduced. To make an engine suitable to the altered conditions the parts must be redesigned, must possess perfect workmanship and be provided with ample bearing surfaces; therefore instead of the material being reduced it has to be increased; what little may be saved in the direction of reduced weight is quickly lost in the extra care expended on the workmanship, the boiler particularly incurring considerable additional expense, it having to be specially stayed and of unquestionable material and workmanship to withstand a working pressure of 200 pounds per square inch. By using a boiler working at this pressure, and an engine running at a speed of 440 feet of piston per minute it may be possible to reduce the weight of an 8-horse portable engine; but to reduce it anything approaching 50 per cent. is entirely out of the question. And if the weight cannot be reduced 50 per cent. we feel certain that the price would be more disappointing still, and the trebled sale would prove itself to be a mere dream, judging by the very limited trade that has thus far been carried on in the light portable engines which have been introduced from time to time.

When the Royal Show was held at Salisbury in 1857, a portable engine was worked at a boiler pressure of nearly 300 pounds per square inch, at an expenditure of coal of but 1 1/4 pounds per indicated horse-power per hour, but we should not be surprised to learn that only one engine was made on these lines. Ten years later a high-speed portable engine was exhibited, which was tested on the brake running at 220 revolutions per minute; the fly wheel was only 3 feet diameter, the cylinder being 8 inches in diameter. This was described as one of the most remarkable engines in the show ground. In 1872 we saw a light portable engine made by an enterprising firm in the South of England, which presented the appearance of having been made out of 1/4-inch diameter bar iron, but, as might be expected, buyers did not take a fancy to this new venture, the designer being its only admirer. In the meantime a very good trade was being done in ordinary portable engines by this firm, while this engine, such as is now recommended by the press, was repeatedly shown to customers, but still it remained in stock, its frail details having often to be covered with tallow and white-lead to prevent them from rusting away. This happened 14 years ago, yet we think the results would be much the same if any one cares to try the experiment now.

Oil Circulation in a Loose Pulley.

After every arrangement in the Babbitt metal line has proved a failure, says the *Boston Journal of Commerce*, and the bronze bush with a space inside for an oil chamber is found to be of no use, a cast-iron sleeve perforated with a number of 3/16-inch holes and fitted loosely, that the wheel may turn on the sleeve or together revolve on the shaft, is found to run cool without giving any trouble. A smooth, even surface has been the cause of heating in a great many cases, and it was only after the bearings were roughed out with a coarse file that they continued to run cool, but it will be noticed that the imperfect surface is always made in the bearing, and not on the journal. It is to be supposed that the load on a shaft is to be evenly distributed over the bearing to work in the best condition and avoid the inequality of pressure that might bring an injurious strain on some portions of the bearing, and by causing a roughness to be left on the bearing surface would be contrary to the first elements of the best working conditions. But these narrow, imperfect grooves are no doubt, when oil is plenty, the means of providing an even pressure over the bearing surface of the journal and keeping the surfaces in contact well lubricated. It has been found that by drilling a hole in the bearing where the most intense pressure is found the oil is ground into the cavity faster than it is drawn out; in other words, the oil has better means of passing down on the receiving side of the bearing where the space is continually growing smaller till it enters the drilled hole than it has in finding its way out, creating a pressure of a number of pounds to the square inch, the tendency of which, it will be easy to see, is to assist in supporting the shaft. If three oil cups are needed to keep a pulley with a perforated sleeve well lubricated there may be no doubt is a partial support to be derived by the overflowing of the perforations with oil, but a far greater advantage desired from the benefit that every portion where the load on the shaft is brought to bear has a reservoir of oil close by to draw from, and not to be deprived, as in a smooth and accurately-fitted box where the particles of lubrication are wiped entirely away before they reach the place where all the friction is found.

Mr. John Birkinbine, of Philadelphia, son of the late Mr. Henry P. M. Birkinbine, hydraulic engineer, who made a specialty of that branch since 1856, has decided to continue his father's business. The benefits of a special training in hydraulics, extended practice, and the accumulated plans, data, &c., give him unexcelled facilities for the prosecution of all work connected with the application of water for power or for public or private supply.

President Sloan, just returned from Europe, says: "Manufacturers and landholders are suffering from the depression of trade throughout Europe, and it is only natural that the sufferers should turn their eyes toward this great and flourishing country."

Foreign Markets.

FRANCE.

PARIS, September 8, 1886.—*Metals*.—Business is reviving but slowly from the summer spell of dullness; meanwhile Metals have been dealt in to a moderate extent only; at mill sustained figures for all but Spelter, which gave way slightly. We quote toward the close, in francs, @ 100 kg.: *Copper*.—Chili Bars, 102 @ 103; Ingots and Slabs, 102 1/2; Best Selected, 110, and Pure Corcoran Ore, 105. *Zinc*.—Banca, 271.50; Billiton, 270; Straits, 265; Australian, 267.50; English, 265. *Lead*. 33 @ 33.75; and *Spelter*, 36.25 @ 36.75. *Iron*.—The French Iron markets, ours included, have been quiet during the week, but this is due to the season, the general situation being sound and promising. Subscription to the World's Exhibition of 1889 has nearly been completed, and we trust this will soon also be the case as regards the Metropolitan Railway. The price of Merchant Iron in this city has been raised to 15 francs @ 100 kg. Old Rails are firm at 7 francs, with an upward tendency. Northern rolling-mill owners have now fixed the price of Merchant No. 1 at 12.50 francs, an advance of 5 s. There is a good export demand for Hardware at the Ardennes. The Haute-Marne district is quiet; it is to be hoped there may be no split in the syndicate. In Central France, at St. Etienne there is a steady run of small orders, keeping the activity of makers busy. *Coal*.—The Paris market remains as quiet as before. The supply of Gas Coal is now being laid in. Prices have not improved.—*Moniteur des Interests Matériels*.

BELGIUM.

BRUSSELS, September 8, 1886.—*Iron*.—The Belgian Iron market has for the moment relapsed into quietude; the amount of orders received during the week has been restricted. The bulk was for Structural Iron. Meanwhile the syndicate of rolling-mill owners goes on displaying great activity in trying to obtain some large foreign contracts; there is little prospect, however, of much turning up in that direction before the season comes to a close. One thing has at all events been gained: the dull summer season has been successfully bridged over, and during these fall months all works have had their full share of whatever orders dropped in, while prices have been sustained throughout. If not much money has been made, at least none has been lost. Meanwhile stocks have been prevented from accumulating, and the situation remains an essentially sound one, with a fair prospect for the future. Following is the foreign Iron and Steel movement in Belgium during the past seven months:

Imports.		1886.	1885.
	Tons.	Tons.	
Iron Ore.....	782,050	791,890	
Steel Ingots.....	21,312	8,158	
Steel Rails.....	11,580	22,392	
Other Rolled Steel.....	101,010	27,499	
Wrought Steel.....	11,700	21,383	
Pig Iron.....	4,483,134	5,339,029	
Old Iron.....	701,491	1,299,139	
Iron Wire.....	171,436	239,831	
Iron Rails.....	3,281	14,767	
Sheet Iron.....	38,402	51,673	
Other Rolled Iron.....	238,640	3,165,155	
Nails.....	23,943	23,506	
Wrought Iron.....	108,269	174,161	
Castings.....	30,693	31,329	
Total.....	6,764,416	8,569,861	

Exports.		1886.	1885.
	Tons.	Tons.	
Iron Ore.....	59,641	98,927	
Steel Ingots.....	1,737	640	
Steel Rails.....	18,194	27,314	
Other Rolled Steel.....	11,165	2,229	
Wrought Steel.....	1,506	995	
Pig Iron.....	14,116	6,588	
Old Iron.....	29,049	2,392	
Iron Wire.....	1,355	1,117	
Iron Rails.....	8,519	4,582	
Sheet Iron.....	22,683	18,748	
Other Rolled Iron.....	129,600	1,12,120	
Nails.....	3,791	14,151	
Wrought Iron.....	17,189	13,812	
Castings.....	18,658	8,977	
Total.....	323,208	322,697	

Coal.—Now that Belgium has succeeded in exporting Coal to Cardiff it is trying to start a big trade therein between Antwerp and Genoa and between Antwerp and Egypt. Between 16 and 20 vessels are leaving Antwerp every month for India, and freights are low.—*Moniteur Industriel*.

GERMANY.

HAMBURG, September 8, 1886.—*Iron*.—In Upper Silesia there were still in full blast 37 furnaces, and their output in August was 9000 tons jointly. Prices of Pig have been steady. Forge 8 @ 41 marks @ ton; Foundry, 48 @ 52; German Westphalia, 48 @ 52; German Eastphalia, 48 @ 52. The rolling mills complain more of the low prices ruling than of lack of orders. There is, in fact, more animation generally. *Metals*.—In Upper Silesia quite a demand has set in this week both for domestic requirements and export for Sheet Zinc, so that some of the rolling mills have to work over-night. The export demand is for Austria and Transatlantic countries. Common Spelter was selling at Bremen at 36.70 marks @ 100 kg.; Lead at 22.50; Sheet Zinc at 33, and Sheet Lead at 25.50. Lead production during the first six months has been 10,120 tons, against 8779 in 1885. In this market Lead has been neglected and Copper very quiet. We quote German Lead, 13.50 @ 14.14; Lake Copper, 52 @ 55; Tin, 101 @ 108, and Spelter, 14.50 @ 15.—*Hornschell*.

HOLLAND.

ROTTERDAM, September 4, 1886.—*Tin*.—The August statistics were as follows:

	July 31, 1886.	Aug. 31, 1886.	Aug. 31, 1885.
	Slabs.	Slabs.	Slabs.
Banca stock on warrants.	34,448	30,304	35,726
Billiton stock here and at Amsterdam.....	22,020	18,220	27,096
Total.....	56,468	48,524	62,812
August deliveries of Banca.....	8,362	14,144	14,271
August deliveries of Billiton.....	4,550	3,800	8,530
Total.....	13,912	17,944	22,801
Deliveries of Banca since January 1.....	79,502	55,616	50,421
Deliveries of Billiton since January 1.....	49,972	53,774	50,177
Banca afloat.....	14,400	7,200	
Banca awaiting coming auctions.....	62,091	70,114	104,463
Billiton afloat.....	22,907	30,367	31,400

Some speculators realizing profits. Banca dropped to 50.50, and Billiton to 50.25, but recovered since, closing at 50.35 and 50.25 respectively. Billiton, December delivery, is bringing 60.50.—*Koch & Thierbohm*.

SPAIN.

MADRID, September 4, 1886.—*Metals*.—Following are the official returns of Spanish exportation during the first six months:

	1881.	1885.	1886.
	Tons.	Tons.	Tons.
Calamine.....	19,493	18,900	18,217
Pyrites.....	325,335	416,974	358,363
Iron Ore.....	2,343,311	1,908,849	2,183,831
Ingots Copper.....	7,300	13,615	13,306
Pig Lead.....	61,177	61,817	51,780
Quicksilver.....	1,168	985	512
Total.....	2,658,774	2,499,499	2,625,192

—*Revista Minera*.

Nac. Por. Plaid	.....	\$7.70	to \$8.00
Hermite Door Knob	.....	\$6.00	to \$7.00
& Towne Wood Knobs. list Dec.	.....	1885	dis 40
iston Knob Co	.....	\$9.00	dis 40
ature Plain	.....	75¢ gross	in dis 10
ure Wood	.....	75¢ gross	in dis 10
se Rubber Tip	.....	dis	04-10-10
ure, Judd's	.....	dis	04-10-10
ature, Sargent's	.....	dis	04-10-10
ature, Hermite's	dis	04-10-10
ure, Pockell's	dis	04-10-10
urriage, Japanese	dis	04-10-10

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NOVELTIES.

The Boston Miter Clamp.

The illustrations given below represent this article, which is put on the market by C. Fred. Howe, 18 Arch street, Boston, Mass. Its use will be readily apprehended



Fig. 1.—The Boston Miter Clamp—Open.

from the illustrations, Fig. 1 showing the miter clamp open, and Fig. 2 representing the position in which it is when closed. It will thus be seen that this clamp has a wrist plate which operates two levers, the points of which enter the wood and force it into place. With this action it will be observed that closing the clamp by moving the handle which is shown in Fig. 1 on the left over to the position on the right, as



Fig. 2.—The Boston Miter Clamp—Closed.

shown in Fig. 2, binds and draws together the joint and also holds the wood firmly in place, so as to permit the driving of nails if desired, for the insertion of which it will be seen that, as indicated in Fig. 1, openings are left in the clamp. This article is neatly made of malleable iron, and is 8 inches in length. It is intended obviously for cabinet and picture-frame makers, carpenters, joiners, &c., who will appreciate its simplicity and efficiency.

The Bean Shot-Gun Cane.

John P. Lovell's Sons, Boston, Mass., are putting on the market this article, which is represented in Figs. 1 and 2, Fig. 1 showing it as a cane, and Fig. 2 in position for firing. When straight, as shown in Fig. 1, the hammer is out of line with the firing pin, rendering it impossible, it is claimed, to discharge it by accident. The barrel is 23 inches in length, the length of the cane when closed being 34 inches, and the weight about 1½ pounds. Special attention is called to the fact that the stock, which is 14½ inches long, drops when in position for firing, giving a bend of 3½ inches, being the same as that in the shot-gun or rifle. It has a rebounding hammer,



Fig. 1.—Shot Gun Cane.

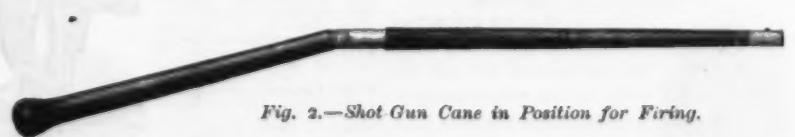
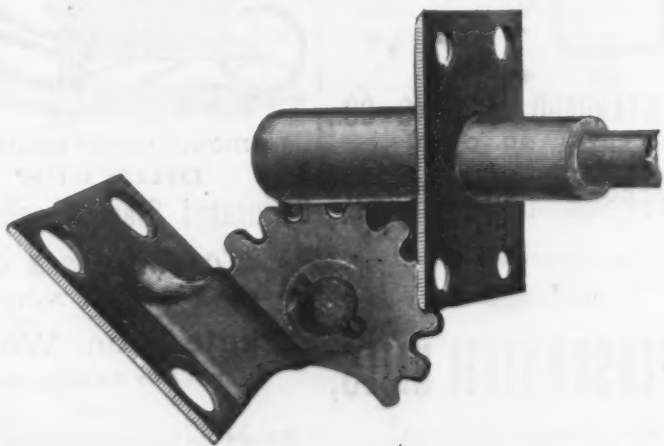


Fig. 2.—Shot Gun Cane in Position for Firing.

a trigger, firing pin, and extractor. These canes are to be made both rifle and shot-gun, the rifle to take a 32 caliber rim or central-fire shell; the shotgun a 40 and 20 caliber shell.

The Dodd Shutter Worker.

The accompanying illustration represents this article as now manufactured by the Dodd Mfg. Company, 19 Park place, New York, indicating the changes which have been made in it since we gave a description



The Dodd Shutter Worker.

of the former style in our issue of May 21, 1885. As at present manufactured all the castings are malleable iron. The worm is entirely covered except where it connects with the gear, and a stud and cotter-pin are used for the pin instead of a screw. By this means it is claimed that much has been added to its efficiency, simplicity and durability. The worker, it will be seen, takes the place of the bottom hinge of the shutter or

blind, and is operated from the inside of the room by a rod which passes through the side of the frame, and is made to revolve either way by turning the crank handle. This is the only part of the worker that shows on the inside of the house. Among the advantages claimed for this worker are that the blinds can be put in any desired position from the inside of the room and without raising the window screens or curtains; that they are locked automatically in whatever position they may happen to be left, and hence can never become unfastened; that they cannot be opened from the outside; that the worker can be applied to any house, old or new, and is particularly useful for bay-windows or any position where the old-style catches cannot be used.

The Royal Damper.

The Muldoon & Ismon Hardware Company, of Minneapolis, Minn., are making a damper, represented in the accompanying illustration, which they claim possesses many features of interest to the trade. Among the points to which they call attention is the fact that the damper-plate is made solid, with a scalloped edge, which construction, the company claim, forces the heat to the surface of the pipes. The spindle and handle are attached to the plate by means of a single nut,

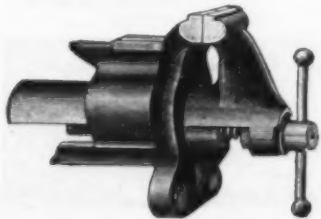


The Royal Damper.

there being no washers or springs employed. The damper is made in four sizes, and can be furnished japanned or nickel-plated, as desired.

Anvil Vise.

The accompanying illustration represents the anvil vise which is manufactured by Hayden & Barnes, Syracuse, N. Y., whose amateur vise, which has been so widely sold, is known to the trade. It will be per-



Hayden & Barnes' Anvil Vise.

ceived that their anvil vise is manufactured on the same principle. It is made of larger sizes, and put on the market with confidence in their quality, and with a view to meeting the demand for a good article of this

character at a moderate price. The sliding bar is described as correctly ground to size, and the screw and lever are made from Bessemer steel. It will be perceived that owing to the manner of their construction the screw is covered its entire length by the bar, and is thus protected from filings, chips or injury. The jaws, anvil and horn are ground and polished, and the body japanned. Of these goods two sizes are already on the market, No. 2 and No. 3. No. 3 has chilled jaws and anvil, the jaws being 2-inch and opening 2½ inches,

Adjustable Countersink.

The engraving below represents a new countersink for wood screws and other purposes which has recently been put upon the market by Otis A. Smith, of Rockfall, Conn.



Adjustable Countersink.

The countersink consists of two pieces joined together by screws and made adjustable so as to fit around the shank of any bit up to ¾ inch in diameter. One of the two pieces of which it consists is a gauge-plate, and this is

arranged to move up or down by means of slotted holes through which the screws pass, thus adapting the conical cutter, which is a feature of the other piece, to cut more or less, as may be required. The article does its work very efficiently, and can be instantly adjusted to fit any size screw-head that may be required. The usefulness of such a tool where hardwood finish is to be put in place will be readily appreciated by our readers.

MANUFACTURING.

Iron and Steel.

Furnace F. now being constructed at Braddock by Carnegie Bros. & Co., of Pittsburgh, will be ready for operation the latter part of next month.

Twelve of the Harden self-feeding nail machines placed in the nail factory of the Ena Iron Works, Limited, at Newcastle, Pa., have given such complete satisfaction that 30 more have been ordered, and will be put in position as soon as possible.

About two months ago the workmen employed at the Lucy and Isabella furnaces, Pittsburgh, demanded a restoration of the wages of 1884, an increase of about 7½ per cent. The demand was refused, when both sides agreed to submit the matter to arbitration. John Jarrett, formerly president of the Amalgamated Association, was chosen to represent the men; J. W. Bailey, of Phillips, Nimick & Co., to represent Carnegie, Phipps & Co. and John F. Slagle to act as umpire. At a final meeting of the arbitrators, held last week, they unanimously decided that the demand was unwarranted and the firm could not pay it.

The Pittsburgh Steel Casting Company, of Pittsburgh, are running full time on their special brands of bridge, forging and other steels. They report business this year greatly in excess of last year.

The new nail mill erected by the Belleville Steel and Iron Nail Company, at Belleville, Ill., is now in complete running order and ready for business. The first keg of nails was turned out September 11. The mill is fully equipped with first-class machinery of improved pattern. The nail machines, 60 in number, were built by A. J. Sweeney & Son, Wheeling, W. Va. The factory building is 80 x 170 feet and is covered with corrugated iron, as are also all the other department buildings.

The Missouri Malleable Iron Company, of St. Louis, have about completed the new addition to their foundry, under whose roof their force of molders can be increased by 40 or 50 men. The first heat was taken off their new cupola on Monday the 13th inst.

The Mahoning Valley Iron Company, of Youngstown, Ohio, inform us that the strike of their nail feeders for three-fifths instead of one-half the amount paid to the nailers has been settled, the feeders returning to work at the old terms on the 13th inst. The above company have ordered a number of self-feeding nail machines, and will equip their factory with them as soon as they prove competent to do the work.

The ironwork for the new blast furnace which is being built at Laughlin Station, on the Baltimore and Ohio Railroad, by Laughlin & Co., of Pittsburgh, is almost completed. The furnace, hot-blast ovens and the draft-stack are all up, ready to be lined, and this work will soon be commenced and will require over 1,000,000 fire-bricks.

On Tuesday, the 14th inst., the Bethlehem Iron Company, of Bethlehem, Pa., shipped 72 carloads of steel rails over the Lehigh Valley Railroad for Western points. The rails go to Buffalo, and are there transferred by steamers plying on the Lakes to their destination.

In the Pittsburgh papers of last week appeared statements to the effect that a secret

meeting of nail manufacturers had been held in the Monongahela House in that city. We learn from reliable authority that no meeting of nail manufacturers has been held since the last regular monthly meeting of the Western Nail Association.

The Selma Iron Company has been organized at Selma, Ala., with a capital stock of \$50,000. The following are the officers of the new concern: George O. Baker, president; Owen N. Montgomery, vice-president; and Joseph M. Baker, secretary and treasurer.

Perkins & Co., Limited, of Sharpville, Pa., inform us that they have blown out their Mabel Furnace for the purpose of re-lining and making other repairs. The furnace has been in blast almost two years and has had a very successful run, making in the past month between 2500 and 3000 tons of pig iron. It is expected to blow in again about October 1st.

The Woodward Iron Company, of Wheeling, Jefferson County, Ala., state that the reports concerning the building of a pipe foundry at their works are largely incorrect. They do, indeed, intend to build such a foundry, but there are no Pittsburgh people connected with it in any way whatever. The works are not designed to use 200 tons of iron a day or anything approaching that amount, and inasmuch as the concern will be built by and operated exclusively in the interests of the Woodward Iron Company, no contract like that stated by our Birmingham correspondent has been made.

The Old Dominion Iron and Nail Works Company, of Richmond, have contracted with Messrs. Gordon, Strobel & Laureau, engineers and constructors, of Philadelphia, to build a complete Bessemer steel plant on Belle Isle. The plant will have two melting cupolas, two converters, soaking pits and hydraulic cranes to handle materials and finished steel. The boilers will be of the Babcock & Wilcox water tube type, and sufficiently large to run the whole plant, which will make 200 tons of steel per day. The works will be run with producer gas. The blowing engines are 36 by 48, and will be nearly 20 feet high, and of sufficient capacity to permit additions to be made to the plant if desired. The main house will be 130 feet long and 60 feet wide. The steel made will be partly for nails, but that is only one of its uses. All kinds of bridge-work, machine steel, wire rods, and bar steel will be offered to the trade.

The directors of the Centralia Nail Mill, Centralia, Ill., are about to consider the advisability of putting up a steel plant.

Machinery.

Messrs. Byram & Co., Detroit, Mich., have recently made shipment of their Colliery cupolas to the following concerns: Lake Shore Foundry Company, Cleveland, Ohio; Petrol Portable Railway Mfg. Company, Minneapolis, Minn.; Whitman & Barnes Mfg. Company, Canton, Ohio; Register & Sons, Baltimore, Md.; Robt. Allison, Port Carbon, Pa.; Oneida Community, Limited, Niagara Falls, N. Y.; Henry D. Hall, Salem, N. J.; Missouri Malleable Iron Company, St. Louis, Mo.; S. L. Bignall Hardware Company, Chicago.

The Roller Chain Belting Company, of Columbus, Ohio, have recently supplied about 10,000 feet of roller chain to a Colorado smelter, besides several hundred feet to a St. Louis elevator for conveyors, &c.

The Warren Foundry and Machine Company, of Philadelphia, N. J., manufacturers of cast iron gas and water pipes, report a fair trade.

The Waterbury Farrel Foundry and Machine Company, of Waterbury, Conn., have sent a large rolling mill to Reed & Barton, of Taunton, Mass.; chilled rolls, 18 inches diameter and 30 inches long; whole weight of mill, nearly 100,000 pounds. They now have several sets of rolls in the works for a large brass rolling mill to be located near Chicago. About 100 power presses are on hand also for different parts of the country. In these presses, as also in their bolt and rivet machines, important improvements have recently been made. In getting up a large hydraulic draw-bench for drawing solid brass tubes the company recently designed a hydraulic valve which has given great satisfaction, and has accordingly been patented. In their line of special machinery recently delivered to purchasers we note a complete outfit of machinery for making iron strap and I hinges. This was sent to Lindsay & McCutcheon, of Pittsburgh.

The Anchor Brand Axle Works, of Auburn, N. Y., under date of September 18, write us: Our new shops at Wilkesbarre are very nearly completed, and we shall commence work there at manufacturing on or about the first day of October. We shall continue to run at least one of our shops in Auburn until such time as our trade will warrant the shutting down and final removal of the machinery from it.

The Humphreys Mfg. Company, of Mansfield, Ohio, are erecting a two-story brick machine shop, 38 x 240 feet, and a one-story brass foundry and blacksmith's shop, 30 x 140 feet.

G. M. Stanwood & Co., Portland, Me., have recently shipped to Bagnall & Lou, Boston, a block machine weighing 5 tons. The dies for this machine, made by this firm, weighed 13,000 pounds. This firm have lately received an order from Austria for a set of Russell pumps and pipe for the same.

The new plant of the Todd Pulley and Shafting Works, East St. Louis, is rapidly approaching completion. Some of the departments are now completed and ready for business.

Hardware.

The cartridge manufacturers of Lowell, Mass., are running overtime to fill orders, and have orders for between four and five months ahead. The present capacity is 125,000,000 per annum.

The contract for the erection of the buildings of the Iowa Barb Wire Company in Allentown, Pa., has been awarded to Martz & Edwards of that place. The dimensions

of the several buildings will be as follows: Main building, 100 x 186 feet; wire mill, 75 x 225; galvanizing-room, 60 x 180; engine-room, 16 x 16; boiler-house, 46½ x 65. All the buildings will be of brick, one story, of a height of 15 feet, and slate roof. The contractors are to furnish all the material, paint the buildings and have them ready by January 1st, by which time it is expected to begin operations.

The co-operative cutlery scheme at Beaver Falls, Pa., is still under way, and those interested in it assert that it has not fallen through by any means. They claim that over two-thirds of the stock has been already subscribed, and that they will have but little difficulty in placing the balance.

The Washburn & Moen Mfg. Company have filed suit against the Freeman Wire Company, of St. Louis, claiming damages in the sum of \$15,000 for infringements of barb wire and machine patents, and asking that the defendant company be enjoined from further use of such patents.

The Western File Works, which have been shut down for the last three weeks to make repairs, will start up full-handed and with plenty of orders on Monday next.

The Hartman Steel Company, Limited, of Beaver Falls, Pa., have secured the controlling interest in a patent machine for the manufacture of steel-wire picket-fence, and in a short time another building will be added to their already large plant and the work of manufacturing the fences begun. The new building will be a frame ironclad, 35 x 70, and will be completed as rapidly as possible. The above company inform us that the demand for their steel-wire mats is greater than can be supplied at present, although their weaving department is running night and day. At present they are turning out 80 mats per day, but will at once erect four additional weaving machines, which will increase the output to 125 per day.

The weaving department in the Hartman Wire Manufactory is now running double turn. The balance of the factory will be put on double turn as soon as boys enough can be trained in the works. Orders for the wire mats are said to be coming in from all parts of the country.

About 85 rollers, hammerers and melters employed in the steel department of Henry Diston & Sons' saw works, Philadelphia, are reported to have gone on strike on Tuesday.

Miscellaneous.

At a meeting of the Connellsville coke syndicate, held recently, it was resolved to close down all its works on Wednesday of each week till further notice, on account of the decreased demand for coke, caused by several furnaces having gone under repairs and others having a full stock of coke.

The following table from the Marquette (Mich.) Mining Journal, exhibits in gross tons the total lake shipments of iron ore from the mines of the Marquette, Menominee, Gogebic and Vermilion ranges for the current season up to and including Wednesday, the 15th, together with the shipments from the same ports for the corresponding period last year:

Name of port.	1886.	1885.
Marquette.....	639,874	536,250
Escanaba.....	1,060,845	906,340
St. Ignace.....	40,533	19,136
Ashland, Wis.....	478,016	42,587
Two Harbors, Minn.....	224,529	165,260
Total.....	2,443,797	1,759,964

The gain over the shipments for the corresponding period of last season being 713,433 gross tons.

All departments of the Litchfield Car Works, Litchfield, Ill., are crowded with work. In addition to a large amount of repair and coach work, ten freight cars are being turned out every day. In the foundry department a number of good contracts are under way, among the number the yokes for the new cable railway in Kansas City.

The Southern Exposition, at Louisville, Ky., has now been running for nearly a month. The attendance so far is almost equal to last year, although there are not so many extensive displays, especially of foreign exhibits. Damosch's orchestral music is very attractive and proves a great source of pleasure and instruction. In the center of the large cross halls is a tower made of Louisville cement. It is about 40 feet high, and forms a series of beautiful cascades, with the water gracefully falling from ledges and projections, and at night the whole tower is lighted from within by electric lights. On each side of the entrance to the art gallery, which is opposite Music Hall, is Scanlan & Co.'s exhibit. This is one of the finest displays of mantels and grates ever shown here, and also a full and varied line of brass goods—such as candelabra, shelf ornaments, fire screens, lamp tables and fire-irons, all of polished brass. The mantels are of marbled iron, handsomely ornamented, and richly carved hardwoods. The Meikle Plow Company, formerly Thos. Meikle & Co., have a very large exhibit of their plows and cultivators. Their Blue Grass sulky plow has been remarkably successful. They have just brought out a new cotton and corn cultivator, both walking and sulky, which is a great improvement. Near the Sixth street entrance is the exhibit of the Hammond type writer. This machine embraces many excellent qualities—such as perfect alignment of lettering, evenness of stroke, &c. Nine styles of type can be used. R. W. McBride is the Southern agent.

The Connellsville Coke and Iron Company, of Philadelphia and Pittsburgh, have decided to put down another coal pit, build 500 new coke ovens and erect extensive new works near Leisenering, Pa. The proposed enterprise is carrying out a programme which the company mapped out some time ago. During the early part of the present year they purchased 9,000 acres of coal land at Leisenering with the intention of putting down five shafts and erecting 2500 coke ovens. Two shafts have now been sunk and 1000 ovens built. The company have been engaged for some time surveying for the third shaft and works. The surveying has been completed, and the new works will

be erected in close proximity to the ones now in operation. The work of sinking shafts and erecting new buildings will be started as soon as possible.

The Pittsburgh Copper Works, at Pittsburgh, turned out five plates each weighing 2400 pounds and being 176 inches in diameter. They are intended for whiskey stills, and are the largest which have ever been made by this firm. The new addition to these works is rapidly nearing completion.

The charter of incorporation of the Bellevue Natural Gas Company was filed at Pittsburgh last week. The capital stock of the company is \$50,000 in \$50 shares.

The Severn Tunnel.

Within a few days of 12 months ago, says *Engineering* (London), the railway tunnel constructed by the Great Western Railway Company under the river Severn was completed and informally opened by an experimental train being successfully run through. A few months later a goods train traveled through from Aberdare to Southampton, but even then the tunnel throughout was not ready for general service. Much more had to be done in regard to absolute pumping and ventilating machinery, and the completion of other extensions of the line in connection with the tunnel. Since January this work has been energetically prosecuted, and at last, on Wednesday, September 1, this important addition to the company's system is to be opened—only, however, for goods, for something yet remains to be executed before passenger trains can be introduced, but even for goods alone the tunnel will be of great value. Compared with such gigantic works as the St. Gothard Tunnel, 9½ miles long, the Mont Cenis Tunnel, 7½ miles long, and the Arlberg Tunnel, 6½ miles long, this Severn Tunnel may perhaps be considered a small affair, but it is 4½ miles long altogether, and it is the longest subaqueous way yet made. It is also the longest tunnel in England, and its construction has been attended by circumstances of difficulty peculiar to cuttings under water, such as are not experienced in the boring of land subways. In the latter operation there may be, and often have been, serious obstacles to overcome owing to the nature of the material to be penetrated, and in some cases springs have been tapped which caused inconvenience; but the quantity of water was not very great and was easily withdrawn, and powerful drilling machinery has been employed to pierce the rock. In tunnelling beneath a wide river there have to be faced not only the ordinary conditions of strata and underground springs, but also the risks of an inflow of the stream above. This danger was happily not realized in the construction of the Mersey Tunnel, but that tunnel runs for only a mile under the water, and the river at that point is as a rule comparatively calm. The Severn undertaking, however, presents a very different story. At the point chosen for the tunnel the river is 2½ miles wide, and this estuary is described as more ocean-like than that of any ordinary English river. Moreover, it is characterized by rocks of a dangerous and solid nature, and there is a difference of as much as 60 feet between high and low tide. These circumstances would not necessarily cause an incursion of water, but, as a matter of fact, the construction of the tunnel was several times stopped, and the whole undertaking jeopardized, both by river and land water. Considering the impediments that have had to be overcome, together with the period occupied, the execution of this work may rightly be regarded as a great feat of engineering skill, and the opening of the tunnel for actual, though partial, public service is an event of real importance.

When the great Western system was carried on to Bristol by Mr. Brunel the intention was to connect it with South Wales by a steam ferry, capable of carrying across the Severn not only passengers, but even loaded goods trucks. Subsequently, however, it was found that only a passenger ferry would be practicable, and consequently up to the present the goods and minerals have had to be taken by a circuitous route in order to cross by a railway bridge. Powers to make this tunnel were sought as far back as 1864, but the attempt failed then, as did likewise a second effort in 1870. In 1872, however, an act was obtained, and the company straightway proceeded with the enterprise. Several shafts were sunk on both sides of the river, and the works were carried on from each end. An experimental heading, about 7 feet high by 7 feet wide, was driven through, and good progress was made. In October, 1879, however, when the two headings were within 120 or 130 yards of meeting, the heading under the Monmouth shore tapped a big fresh-water spring, and in 24 hours that half of the work was flooded. Up to that time Mr. T. Richardson was the engineer conducting the work, Mr. (now Sir John) Hawkshaw acting as consulting engineer, but after this disaster Mr. Hawkshaw became engineer-in-chief, with Mr. Richardson as coadjutor. Upon his advice the bottom level of the tunnel was lowered by 15 feet, and in other ways the original design was altered; the company also transferred the work of construction by contract to Mr. J. A. Walker.

Two brick dams of enormous strength and great thickness were built across the heading down which the water had flowed in, and thus further approach to the shafts and works under the Severn was prevented. Powerful pumping engines were then set to work, and by the end of the year the water was withdrawn and excavation could be resumed. During the operations of clearing the works a very difficult and dangerous task was accomplished by a diver named Lambert. At a distance of 1000 feet from the bottom of the Sudbrook shaft there was a door, which required closing across the drift under the river. Assuming a Fleuss diving dress, and carrying a heavy crowbar, Lambert descended the shaft, made his way to the door, and succeeded in shutting it. This was, however, only managed with extreme difficulty and the exercise of great strength, for the door had got stiff on its hinges, and the diver was under water nearly an hour and a half. The clearance being at length

affected, the work was carried on vigorously, and by the autumn of 1881 the two headings met and a through passage was obtained. Prior to this, however, viz., in April, 1881, a slight but troublesome mishap had occurred. While the brickwork from the seawalls shaft was being completed a hole 10 feet across was found in the marl near the Gloucestershire shore, and through this the water again rushed in too strongly for the pumps. By the use of clay puddle the hole was filled up, and the pumps cleared out the water. By the autumn, as we have said, the junction between the two cuttings was effected, and all went on well until October, 1883, when another catastrophe took place, by which the whole work was again threatened with destruction. As mentioned already, the level of the tunnel was lowered after the first flooding, and while the men were at work in these lower levels, on October 18, 1883, the spring which had burst through in 1879 was again tapped, and the water rushed in in enormous volume. The inflow was estimated at 27,000 gallons a minute, and very soon a considerable portion of the completed work was flooded. Once more the diver Lambert came to the rescue, but this time with assistants. Again a door had to be reached and closed, 500 feet from the bottom of the shaft. Placing one assistant at the foot of the shaft, and another 250 feet forward, with the air-tube he made his way to the door, and, as before, succeeded. Meanwhile the pumps had checked the flood, and, additional pumps being laid on, the tunnel was cleared in about a fortnight. So far the two most serious interruptions had come from the fresh-water spring, but the contractors had yet to deal with an inroad from the river. On one occasion a huge tidal wave flooded a portion of the workings, but this was soon dealt with, and to guard against a repetition flood banks were eventually erected with a height of 5 feet above the highest flood known. All these obstacles at last surmounted, the work was hastened on, and in October, 1884, the chairman of the committee, Sir D. Gooch, was able to pass through from the English to the Welsh heading. A year later the first train went through; after September 1 goods and mineral traffic will be established, and probably within three or four months, after some completing operations have been effected, the whole of the new system will be available also for passengers. The total length of the tunnel is 7664 yards, or, say, nearly 4½ miles, and to these the open approaches add something like the same distance.

The height of the tunnel is 20 feet from the rails, with a width of 20 feet. In the deep parts of the work the tunnel is lined with Staffordshire and other vitrified bricks set in cement, 3 feet thick, but as it rises the thickness is gradually reduced to 2½ feet. The water, at what is called the "shoots," is 33 feet at low water and 91 feet at high water, and at this point the tunnel has a covering of 45 feet, though under the depression called the "salmon pool" there is a covering of only 30 feet. On the Gloucestershire side the gradient is 1 in 100 down to the lowest point under the "shoots," whence it rises 1 in 90, the heaviest loads being expected from Wales. With a view to the drainage a culvert 5 feet in diameter is provided, falling from the lowest point in the tunnel to the Sudbrook shaft. The water entering the works in the open cuttings will be intercepted at either mouth of the tunnel, and there pumped at the higher level, in order to reduce to a minimum the pumping at the Sudbrook shaft. It is believed that the pumping may be reduced to 5000 gallons a minute, but unless the plan has been recently changed permanent machinery is or will be provided capable of four times that amount of pumping. Equally powerful and adequate ventilating apparatus is also provided. Altogether 11 shafts have been sunk—three on the English side, eight on the Monmouthshire side—and between 70,000,000 and 80,000,000 bricks have been consumed. Over 700,000 cubic yards of excavation have been accomplished, and during one month as many as 400 yards were tunneled. More than a mile of the tunnel was cut through the Pennant sandstone of the coal measure; ½ mile through conglomerate overlying the Pennant; ½ mile through shale of the coal measure, with occasional beds of coal, one of which was a foot thick, and the remainder was through red marl of the new red sandstone. Hereafter the railway journey from London to South Wales has been the roundabout route via Gloucester; but the tunnel is 12 miles lower down the Severn than the railway bridge, and passengers will now travel to Bristol and thence through the tunnel. The distance between London and South Wales will be reduced by 15 miles, and even between Bristol and South Wales the time occupied will be shortened by about an hour. As to the cost, by the time everything is done it will probably approach £2,000,000, the whole of which is borne by the Great Western Company.

Work on the new club-house for the Vanderbilt employes, to be erected on Madison avenue and Forty-fifth street, will be commenced immediately. The main building will front 79 feet on the avenue, and be three stories in height, with a tower. The material is Philadelphia brick, decorated with terra-cotta.

John R. Whitley, representing the American Exhibition to be held in London next summer, and who has been in the United States for the last six months, says that preparations on this side are well advanced.

A yacht propelled electrically started from Dover across the English Channel to Calais, on the 13th inst. She reached Calais in 3 hours 51 minutes. The return trip was made in 4 hours 15 minutes. The accumulators, as reported, were charged only once for the whole journey of 50 miles.

Improvements now making on the line of Broadway involve the expenditure of some \$12,000,000 or \$15,000,000. Most notable is the enlargement of the Equitable Life building, to be completed next spring, and which

will then represent an expenditure of \$3,000,000. The estate of Herman B. Aldrich, represented by Spencer Aldrich, is spending \$1,500,000 on a large 10-story edifice at Nos. 41, 43 and 45 Broadway, running through to Trinity place. Near Madison square, upon southeast corner of Broadway and Twentieth street, Robert and Ozden Goelet are building a structure noticeable for its substantial strength and simple beauty. D. H. McAlpin, the millionaire tobacco manufacturer, has nearly completed an elaborate edifice which is to be fitted up for bachelors' apartments and studios, on the corner of Broadway and Thirty-third street, while three blocks further on Louis L. Todd, the proprietor of the family hotel the Vendome, encouraged by his success there, is laying the foundations for a still larger hotel, to be called the Grosvenor House. These are among the finer examples of architectural skill which now attract attention.

Mr. Denby and the other foreign ministers at Peking protest against the further obstruction of the South Channel at Canton by order of the Chinese Government. He contends that under the treaties no country has the right to destroy access to its ports.

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RICHMOND CEDAR WORKS, Limited,
MANUFACTURERS OF
White and Red Cedar and Oak Ware,
RICHMOND, VA.
PATENTED AUG. 24, 1886.



The above cut represents our new "King" Well-Bucket. This Bucket is made of best Oak Timber, is heavily ironed and nicely finished. This is the strongest and best Well-Bucket ever offered to the trade, and we claim the following advantages:
1st. The Bucket is made of tongue and groove staves, turned smooth inside and out, and is warranted not to leak.
2d. The strap-car runs down side of Bucket, and is so stamped that it fits over the hoops and lays under the stave at bottom. The car is securely fastened with staples, and it is impossible for hoops to come off.
3d. The Bucket is so shaped that it lies flat on the water, and dips with much more ease than the ordinary bulge bucket. The bulge is a disadvantage and causes the Bucket to rock on the water like a boat and prevents it from dipping easily. Price List furnished on application.

F. DEMING,
BUILDER OF
SPECIAL MACHINERY,
WATERBURY, CONN.]

FINE GARDEN TOOLS.

THE "PEERLESS."

THE "PRIZE."



The Shank, Head and Teeth are all forged from one solid bar of Steel—no iron, no welding, all steel—are not punched out, but drawn under a Hammer, and shaped without Seams or Flaws. Every Rake is Hardened, Oil Tempered and warranted not to break at Shank.

THE
'Iowa' Solid Steel Blade Weed Hoe.
In the ordinary pattern of 4 and 6 prong Weeders, the Iron Shank and the Blade are welded on; they easily break off, and the tool cannot be polished well. The "IOWA" has Teeth and Blade of one solid piece, and is given a brilliant polish of steel. These Tools are patented, and made exclusively by us.

THE IOWA FARMING TOOL CO.,
Makers of a Complete Line of Steel Goods and Wood Goods,
FORT MADISON, - IOWA.

ILLUSTRATED CATALOGUE SENT ON APPLICATION.

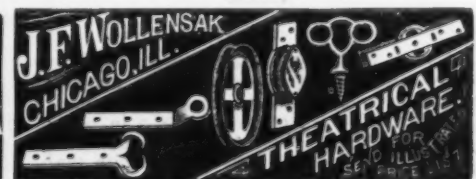
W. H. JACOBUS.

DONALD McKAY, JR.

W. H. JACOBUS & CO.,
HARDWARE MANUFACTURERS' AGENTS,
No. 90 Chambers Street, New York.

AGENTS FOR

The Morris Sash Lock Mfg. Co., The Ireland Mfg. Co., Lorenz Bommer, Penn Lock Works,
Dibble Mfg. Co., Thurston Mfg. Co., Zimmerman's Billad Adjusters,
Keystone Screw Co., J. F. Wollesak, Tuck Mfg. Co.



Double Acting Spring BUTTS
SABIN'S LEVER DOOR SPRINGS,
Coil, and Sabin's Volute Springs
For various purposes made to order.
SABIN MACHINE CO., Montpelier, Vt.

LIGHT! LIGHT!
BE YOUR OWN GAS COMPANY.
THE ELECTRIC WALL TORCH

FOR COAL OIL OR NAPHTHA.
These torches are guaranteed to be the best in the market, and the only ones that will satisfactorily vaporize coal oil and naphtha without clogging up.

Produce a light equal to eight gas jets, at the cost of less than one penny per hour. They are used by the largest manufacturing establishments in the country, and we are prepared to furnish the highest testimonials.

PRICE, \$2.00 EACH.



THE STANDARD LIGHTING CO.,
CLEVELAND, OHIO.

JEFFERSON IRON WORKS,

Steubenville, Ohio,

MANUFACTURERS OF

JEFFERSON STEEL NAILS,

WITH NATURAL GAS FUEL.



The "Household" Patent Emery-Wheel Knife Sharpener

It meets the demand for a practical and inexpensive article for sharpening knives, scissors and other cutting implements. It does its work quickly and effectively. The Adjustable Table, with Scissor-Guide, enables any one to sharpen knives or scissors properly. It can be raised or lowered as desired. The wheel is 6 x 1, with rim of Solid Emery, and WARRANTED DURABLE. The machine is fastened to a table or shelf by turning a thumb-screw. Send a receipt of price, \$1.50, by express or mail, prepaid, to any address. Liberal terms to the trade. Patented March 16, 1885. Agents pending. Address Crystal Emery Wheel Co., Northampton, Mass. OFFICE OF DR. R. F. BEARDSLEY, BRIGHTON, N. Y., April 18, 1886.

CHAR. E. STEVENS, Treas. Dear Sir:—You ask how I like the Patent "Household" Emery-Wheel Knife Sharpener sent me. I reply, I am delighted with it in the fullest sense. It is all you claim for it and more. I am sure you must meet with a ready sale for them. Every one who has seen mine asks, "Where did you get it?" "I must have one." &c. I would not sell mine for five times its cost if I could not get another. You are at liberty to use this if it is of any use to you. Most truly yours, B. F. BEARDSLEY, M. D.



THE STRONGEST AND BEST WHEELBARROW IS

DREYFUS'

Corrugated Steel Wheelbarrows.

I. C. DREYFUS & CO.,

29 Rose Street, New York.

Eagle Iron Works,

WILKES BARRE, PA.

Wrought-Iron Fencing of any design. Builders

Ironwork. Adam's Metallic Picket Fence. Coal,

Sand and Gravel Screens. Send for Circulars and

Price List.

BRITISH PATENTS secured daily. Provisional

protection (12 months), 50/-; to complete pat-

ent, £6, 10/-, including tax, drawings and all

charges. Full patent taken at first, £8, 10/- No

extra. Write for circular. Patents sold or

licensed. S. S. BROMHEAD, C. E., Mem. Soc.

Art, Patent and Registration Agent, 97 Newgate

Street, London, England.



Wrought Iron. Anti-Friction.

IT EXCELS ALL OTHERS

Security of Door.
Strength of Material.
Ease of Motion.
Simplicity of Application.

THIS HANGER

Requires no Oil.
Has no Flanged Wheels.
Packs snugly for Shipment.

SELLS BEST.

VICTOR
MFG. CO.,
Newburyport, Mass.

JOHN T. LEWIS & BROS.,
SUCCESSORS TO MORDECAI LEWIS.
Established 1772.



Pure White Lead in oil, the most reliable for White-
ness, Fineness, Body, and Covering Capacity.
RED LEAD, Litharge and Orange Mineral.
PAINTERS' COLORS of a Very Superior Quality.
LINSEED OIL, Raw, Boiled and Refined.

JOHN JEWETT & SONS,
MANUFACTURERS OF THE WHITE LEAD. WELL-KNOWN BRAND OF



ALSO MANUFACTURERS OF
LINSEED OIL.
181 Front Street, New York.



ATLANTIC WHITE LEAD
and LINSEED OIL CO.,
MANUFACTURERS OF

ATLANTIC "PURE WHITE LEAD," unequalled for Uniform
Whiteness, Fineness and Body. The most reliable White
Lead made. RED LEAD and LITHARGE.

Raw, Refined, and Boiled
LINSEED OIL

287 Pearl St., New York.

Grindstones, Emery, &c.

THE CLEVELAND STONE CO.,
Manufacturers of

GRINDSTONES,
MOUNTED STONES,

SYTHE STONES, &c.,
BUILDING STONE and

SAWED FLAGGING.

OFFICE:

71 & 73 Wilshire Building CLEVELAND, OHIO.

Walter R. Wood,
GRINDSTONES,
Berea, O., Nova Scotia & other brands.

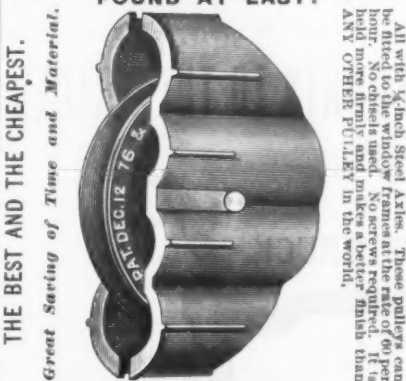
283 and 285 Front St., New York.

GEO. CHASE.

Genuine Green Paper Brand Wash-
ita Stone is the Best

OIL STONE.
107th St., Harlem River, N. Y.

The Empire Sash Pulley. FOUND AT LAST!



MANUFACTURED BY
EMPIRE PORTABLE FORGE CO.,
COHUES, N. Y.,
Manufacturers of the largest and best line of
Portable Forges and Hand Blowers.
FOR SALE EVERYWHERE.

What is Said of
"MORTON'S SASH CHAINS."

NEW YORK, July 29th, 1886.
THOMAS MORTON, Esq.
Dear Sir: I have much pleasure in informing you
that the Cable Chains used throughout my house, built
twelve years ago, have not in a single instance given
any trouble, and see no reason why they should not
last a lifetime. Yours respectfully,
F. C. BARNUM, 108 Chatham Square, New York.

ME. THOMAS MORTON.
Dear Sir: We take pleasure in testifying to the ex-
cellency of your patent Champion and Cable Sash
Chains. The best endorsement we can offer is that
in no instance coming under our observation, where
it was properly hung, has it failed to give entire satis-
faction. We can cheerfully recommend your Sash
Chains to all parties that contemplate building, and
can say our sales have increased a hundred fold in the
last six months. It is becoming very popular, has
worked a revolution, and will in time supersede all
sash cords. Respectfully yours,
HOPKINS & STEINER,
180 Federal Street, Allegheny, Pa.
MANUFACTURED BY
THOMAS MORTON,
65 ELIZABETH ST., NEW YORK.

THOMAS MORTON,
65 ELIZABETH ST., NEW YORK.



"Challenge" Fire Hose Carriage

Holds from 500 to 800 feet of 2 1/2-inch Hose; 44-inch
Wheels; Patent Swing Tool Box; no weight on han-
dles; nickel-plated trimmings; light and easily han-
dled. Price, including 300 feet best quality 2 1/2-inch
Linen Hose, coupled, \$1,000.

EDWARD H. JACOBS & CO., Mfrs., Randolphville Conn.

MOULTON'S
Improved Lemon Drill.

Patented June 28th, 1886.
Will extract the LAST DROP of
Juice from large and small lemons
in five seconds.

Sent by mail on receipt of 15 cents; \$1 per doz.
10% discount from this next 30 days, cash
with order. Agents wanted. Ask your job-
bers for them. Address patentee and sole
manufacturer,
W. F. MOULTON, Burlington, Vt.

The ACME SHEAR CO.

Bridgeport, Conn., U. S. A.,
Manufacturers of
CAST SHEARS.

The Best and Cheapest in the market. Lamp Trimm-
ers, Lamp Squeezers, Ice Picks and Tongues, Nut
Crackers &c. Send for price list of specialties.

BUFFALO SCALES

STANDARD FIRST PREMIUM
AWARDED AT THE WORLD'S EXPOSITION, New Orleans,
(Four Gold Medals). All other principal makers
competing. Truck Scales, Hay Scales, Platform
Scales, etc. Important patented IMPROVEMENTS.
BEST VALUE FOR YOUR MONEY. For circulars, terms and
BUFFALO SCALE COMPANY, BUFFALO, N. Y.

METAL AND RUBBER STAMPS,

steel figures and letters,
name stamps, type for type
writers, child-proof figures
and letters, stamps for rat-
ing letters on wood or
metal, branding irons, pat-
tern letters, stencils, house numbers, metal bodied
rubber type, rubber stamps, &c. Send for free illus-
trated catalogue.

BELLOWS & DICKY, 837-843 Sherif St., Cleveland, O.

BUFFALO HAMMER COMPANY, Buffalo, N. Y.

Manufacturers of a full line of

SOLID CAST STEEL HAMMERS

Forged from the best Crucible Steel.

All Hammers Fully Warranted.

Drop Forging a Specialty.

THE WEEK.

The Canadian Pacific Railroad is aiming
to secure an independent branch to Chicago.
It already has a controlling interest in the
Minneapolis and Manitoba Railroad, and
further developments are looked for.

An elevated railroad company has been
organized in Philadelphia to build a system
of tracks in various parts of the city at a
cost of \$6,000,000; Geo. H. Baker, presi-
dent.

Some months ago it was stated that a plan
of electric signaling from balloons was in-
vented by Mr. Eric S. Bruce, having special
advantages for army purposes. This method
of signaling was tried a short time ago by
the British military authorities at Chatham,
and it appears that it has given entire satis-
faction. The light thrown down by an il-
luminated balloon was so brilliant and
diffused over so wide an area when the bal-
loon was at a considerable height that some
one suggested that such a light might well
be made use of for conducting certain mili-
tary operations at night.

The records show that property in this
city valued at about \$200,000,000 has
changed hands since the year began, and
that buildings have been begun which are
expected to cost about \$45,000,000. This
indicates an increase of about 25 per cent.
in the amount of sales, while the cost of
projected buildings is on a still larger scale.

The project of bridging the Thames River,
near New London, Conn., in the interest of
the Shore Line has been abandoned. The
soundings showed 35 feet of water and 70
feet of mud, and the requirement of the
War Department that the bridge should be
32 feet above high water would bring the
cost up possibly to \$2,000,000, the interest
on which would be double that of operating
the ferries.

The Montreal lumber trade is almost
wholly with South America and the West
Indies, while the deals are sent to Great
Britain. As many as 80,000,000 feet of
deals were exported from that port last
year, which was 100 per cent. more than
the shipments of 1884. The exports of the
current year will be considerably in excess
of those of last year. The South Ameri-
can trade shows a steady increase since
1876. In 1884 the whole export from the
St. Lawrence was nearly 37,000,000 feet;
last year it was 31,344,543, of which 26,-
465,543 went from Montreal. Commercial
Agent Hotchkiss, at Ottawa, in the course
of an exhaustive report to the Secretary of
State upon the lumber industry of Canada,
says that while the increased export duty
upon saw logs is published as being from \$1
to \$2 per 1000 feet, board measure, it is
evidently intended that when the export
becomes developed the duty shall be further
increased to \$3 under the discretionary
power vested in the Governor-General,
which rate, it is supposed, will be prohibi-
tory.

A cyclone which swept through Illinois
and Indiana on the 16th inst. made havoc
with roofs in Michigan City, Terre Haute,
Shelbyville and many other points.

H. G. Trout, of Buffalo, N. Y., has con-
tracted with B. Mills & Co., of Buffalo, to
furnish a fore-and-aft compound engine,
cylinder 28 x 52 by 45 stroke, for the 2000-
ton steamer they are to build; also for a
fore-and-aft compound engine, 28 x 50 by
42 stroke, with George Berriman, to put into
a steamer building by Radcliffe, of Cleve-
land. He will also build one for Capt.
James Davidson, of Bay City, Mich., which
will be 28 x 52 by 45 stroke.

The Pittsburgh Copper Works last week
turned out five plates each weighing 2400
pounds and being 176 inches in diameter.
They are intended for whisky stills, and
are the largest which have ever been made
by this firm.

The British have secured a coaling station
on the Roumelian coast. Rival powers seek
facilities for supplying their steamers with
fuel as a consideration of the first impor-
tance, whether in war or peace.

The revival of the lake shipping trade this
year has given a fresh impetus to ship con-
struction. At all of the principal building
ports the shipyards are crowded with new
work.

Baltimore is receiving a large proportion
of the grain trade. The preference shown
for that route by Western shippers was sup-
posed to be due to the New York system of
inspection, which in many instances recog-
nizes "no established grade," but an exami-
nation does not show that it is justified. It
is expected that the New York Produce Ex-
change will soon take action on this subject.

An astronomical writer in the Philadel-
phia Ledger discourses upon the grand re-
velations to be expected when the Lick Ob-
servatory, with its 36-inch object glass, is
complete. There is a provisional under-
standing among astronomers that the highest
power capable of being used on a telescope
will not exceed 100 for each inch of ap-
erture—that is, a good telescope of 8 inches
will bear, under the best possible circum-
stances, a magnifying power of 800; one of
12 inches, of 1200, and so on. Applying
the same rule to this glass it would magnify
an object 3600 times. This would enable the
moon to appear as if it were only about 70

miles distant and were seen with the naked
eye, a view which would bring into sight
objects no larger than many of our build-
ings. The atmospheric disturbances would
modify this very seriously at our altitude,
but these are supposed to be reduced to a
minimum on the choice site on Mount Ham-
ilton.

The merits of the electric motor as con-
trasted with the steam engine are discussed
by John Murray Mitchell, S. E. E., who
claims a great success in the application of
electricity for the conversion of coal energy
into steam power, then into electricity, and
its reconversion into energy by use of elec-
tricity. In evidence he refers especially to
the running of the street railway in Balti-
more, which has been in operation more
than a year, and says: "The reason that
it is more economic than the locomotive or
small stationary steam engine is that the
locomotive and small steam engine burn
from 6 1/2 to 15 pounds of coal per horse-
power per hour, according to their size and
construction, the large steam engine, on the
contrary, such as 100 horse-power and over,
burning from 3 to 1 1/2 pounds of coal per
horse-power per hour, according to their size
and perfection of construction. It has been
proved that 70 per cent. of this power can
be recovered at the place of consumption of
the power, whether it be on the track or for
use in factories. In other words, only 30
per cent. of the power is lost in the trans-
mission and conversion of energy by elec-
tricity. Admitting that 50 per cent. is lost
in transmission instead of 70 per cent., we
would thus have our power for from 4 1/2 to
2 1/2 pounds of coal per horse-power per hour,
as contrasted to 6 1/2 and over before men-
tioned.

Cholera is making alarming strides in
Japan and Korea. Precautions against its
appearance in the United States should not
be relaxed.

Newcomers at our hotels are shown the
"cot in the parlor."

A London paper publishes a partial list of
the stockholders in the ordnance factory of
Sir William Armstrong, Mitchell & Co., in
proof of the charge that the army and navy
officers are peculiarly interested in the con-
tracts of that firm with the Government.
Each of the persons named, many of them
high in official station, appears to own shares
in the company ranging in value as high
as \$200,000 or upward, and interesting
developments are promised.

These is said to be a severe hitch at
Madrid in the commercial treaty with the
United States, arising from alleged am-
biguity in defining what constitutes direct
and indirect shipments. The Spanish traders
declare that if the interpretation of the
phrase contained for by the American
Government is admitted, it would destroy
the last remnant of the preference which
is left to Spanish shipping.

The cornices and gutters of the extensive
school buildings just completed at West-
town, Chester Co., Pa., for the Orthodox
Friends are wholly formed of copper, and
the cost of the entire structure is \$200,000.

The Parrott Iron Works, at Greenwood,
Orange County, which suspended more than a
year ago, were sold at foreclosure sale 17th
inst. by William Van Amee, at Goshen. The
purchaser was E. W. Harriman, of New York
City, and the price paid \$52,500. There
were 46 plots of ground, comprising 10,000
acres, on which there was a mortgage of
\$150,000. The plaintiff in the action is
James Paulding.

Eli Whitney Blake, inventor of the Blake
stone crusher, and a nephew of the late Eli
Whitney, inventor of the cotton gin, died in
New Haven 18th inst., aged 91 years. He
was graduated from Yale in 1816, and re-
ceived the degree of LL.D. in 1878.

The work of repairs in Charleston is some-
what retarded by the exorbitant demands of
certain classes of mechanics, but as it is
probable that steps will be taken to procure
workmen from the North and elsewhere
who will work for reasonable wages the de-
lay will be of but little consequence.

Reports received from planters in the
cane growing parishes of Louisiana indicate
that the sugar yield will fall about 15 per
cent. below that of 1885.

The reception ceremonies to be tendered
the delegates to the General Convention of
the Knights of Labor at Richmond, October
4, comprise an address by Governor Fitz-
hugh Lee.

The New York Chamber of Commerce
will agitate the subject of harbor improve-
ment at their next meeting, also Mr. Hew-
itt's bill creating a Court of Customs.

John Roach has received from the Gov-
ernment \$45,000 in settlement of all claims
on account of the dispatch boat Dolphin
and monitor Puritan. The law of August
3, 1886, requires the contracts for the new
ships to be let to the lowest and best respon-
sible bidder or bidders for the work which
they offer to undertake, but the Secretary of
the Navy is also authorized to reject any or
all bids. Now that the dispute between the
Government and Mr. Roach has been set-
tled there is apparently no reason for the re-
jection of his bid if it should prove to be the
lowest and best. The advertisement of
Secretary Whitney offering a premium of
\$15,000 each for suitable plans for the two

double-bottomed armored steel vessels of
6,000 tons displacement authorized by the
act of August 3, 1886, it is thought, will not
appeal in vain to the inventive skill of
American shipbuilders. It is learned that
several young and ambitious officers of the
navy intend to compete for these prizes
under assumed names, so that the designs
presented may be judged upon merit alone,
and it is also expected that all the promi-
nent shipbuilders and designers of this and
other countries will submit designs for these
ships.

An importer in Barclay street, this city,
exhibits a rare novelty that might be called
a "steam-engine clock," made in Paris, at a
cost of \$250. Beneath the dial is a finely-
polished upright steel cylinder, with the
piston in active motion, while above is the
revolving fly-wheel, surmounted by a gilt
governor, the latter parts of the mechanism
exactly filling the space within the glass
dome, the periphery of the fly-wheel con-
forming to the outline or arch described by
the casing. The engine, with its lateral
supporting metal columns and moving parts
above and below, more resembles that of a
first-class Sound steamer than a clock.

The New York Charities Commission pro-
pose to erect a model penitentiary on Riker's
Island to cost \$1,000,000. Most of the stone
required is already prepared at the Black-
well's Island quarries.

Inspector Byrnes says all the improved
locks and safes, as fast as they come out,
are carefully studied by the first-class burg-
lars, whose skill keeps pace with that of the
mechanic and even goes beyond it, but so
many expert cracksmen here have had locks
and bolts shut against them that this once
flourishing industry is severely depressed.

Another model tenement is being erected
at a cost of \$100,000, on Fourteenth street
and Avenue C, by Wm. B. Cutting, presi-
dent of the Improved Dwelling Association,
and his brother, Fulton B. Cutting. The
ground dimensions are 114 x 88 feet, the
height six stories. The two main entrances
and stairways will be wholly fire-proof.
The object is to give poor people superior accom-
modations for their money.

The Adams Express Company will erect a
fire-proof building for commercial and stor-
age purposes on Fourth avenue, above the
Belvidere Hotel, which will cost \$1,000,000.
On the lower floor tracks will be laid for the
entrance and departure of cars, more espe-
cially for the accommodation of Eastern
business.

Acting Attorney-General Jenks has given
an opinion to the Treasury Department in
regard to the provisions in the Tariff Act
imposing a duty of 75 cents per ton upon
ore. The question arose on a claim of a
firm of importers that the provision for
iron ore refers to ore dry at the temperature
of 212° F., which it is understood is the
test or standard adopted in commercial
transactions. The Attorney-General holds
that if iron ore dried at a temperature of
212° F. be what is known in commerce as
iron ore, it is the ore contemplated by the
statute, and on that basis the duty should
be levied.

The new United States steamer Atlanta
made an average of over 11 knots an hour
through Long Island Sound to Newport,
and her engines worked satisfactorily.

Mayor Harrison, of Chicago, has been
interviewed respecting the anarchists now
awaiting trial, and takes ground that they
should be sentenced to the penitentiary for
life rather than hanged, unless Lingg, the
bomb-thrower, is excepted. He says: "To
imprison these men, with shaved heads and
striped suits, in the penitentiary would be
to disgrace and degrade their cause, but to
hang them will be to dignify them and make
them martyrs, and the blood of the martyrs
is not alone the seed of the Church, but the
baptism of the cause for which that blood is
shed. It would not do for us to make the
mistake of thinking that this is but a hand-
ful of men. There will be no more bomb-
throwing; that is ended. But there will be
an immense amount of feeling and of senti-
mental following, strengthening the great
column behind, which at present does not
sympathize with the throwing of those
bombs."

The Customs Department at Ottawa give
notice that, as there is no reciprocal coasting
trade between Great Britain and the United
States, United States vessels cannot be
allowed in any manner to participate in such
trade; such vessels cannot go from place
to place to take in cargo. On the point in
question our laws have allowed full reci-
procity with Canada, and the action of the
Ottawa Government appears to be without
provocation. The United States statute
allows a foreign vessel to unload the inward
cargo, or with a part of her outward cargo
she may proceed "from one port of the
United States to another to complete such
cargo."

The Electric Subway Commission and the
Western Union Telegraph Company are now
entering upon a legal contest of which the
end will be by and by. Last Friday all the
parties concerned became aware that the
police had received instructions to enforce
the law prohibiting the suspension of tele-
graphic wires on the elevated railway
structures or elsewhere, agreeably to a de-
cision by Corporation Council Lacombe



ASK YOUR JOBBER FOR

ALAN WOOD COMPANY'S PATENT LEVEL GALVANIZED SHEET IRON

AND HAVE NO OTHER.

Absolutely FLAT and FREE FROM ALL BUCKLES.

Silver Medal awarded by Franklin Institute 1885.

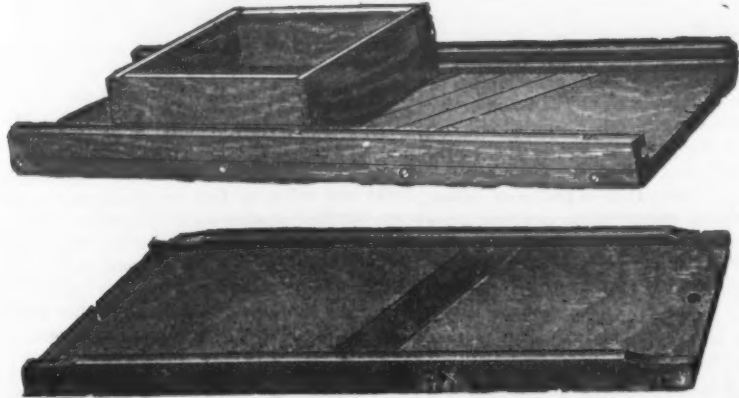
Every Bundle branded "PATENT LEVEL."

ALAN WOOD COMPANY, PHILADELPHIA.

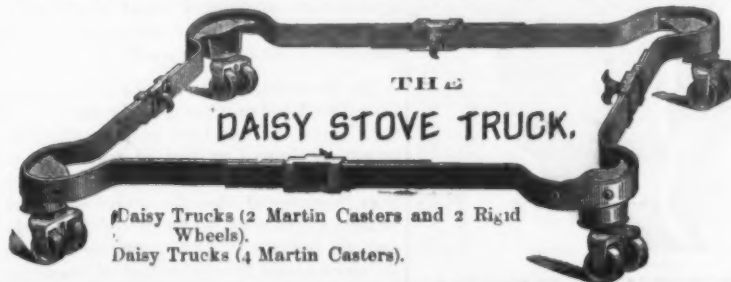

THE TUCKER & DORSEY MANUFACTURING CO.,

INDIANAPOLIS, INDIANA.

Manufacturers of Alarm Tills, Stove Trucks, Saw Bucks, Kraut, Slaw and Vegetable Cutters, Towel Racks and Rollers, Tinner's Mallets, Hats and Coat Racks, &c., &c.



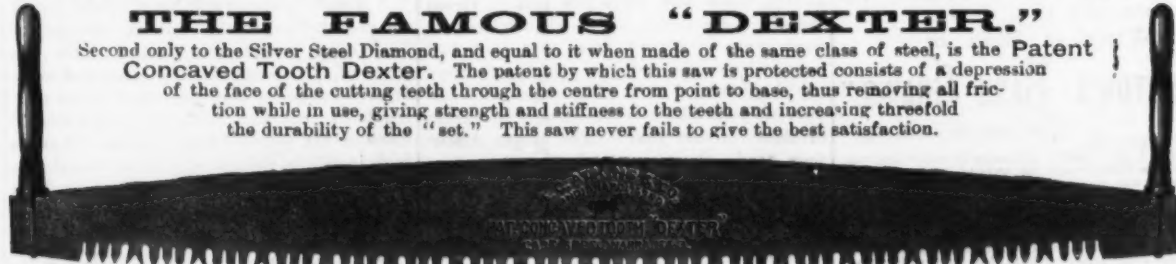
WRITE FOR PRICES AND DISCOUNTS TO THE TRADE.

THE
DAISY STOVE TRUCK.Daisy Trucks (2 Martin Casters and 2 Rigid
Wheels).
Daisy Trucks (4 Martin Casters).

E. C. Atkins & Co., Indianapolis, Indiana.

THE FAMOUS "DEXTER."

Second only to the Silver Steel Diamond, and equal to it when made of the same class of steel, is the Patent Concave Tooth Dexter. The patent by which this saw is protected consists of a depression of the face of the cutting teeth through the centre from point to base, thus removing all friction while in use, giving strength and stiffness to the teeth and increasing threefold the durability of the "set." This saw never fails to give the best satisfaction.



Ground substantially uniform gauge on the toothed edge, and any gauge required on the back.

ATKINS'

Cross-Cut, Circular, Band and Gang

SAWS

Are Everywhere Recognized as the
Standard of Excellence.

D. S. JENKINS,

Brockton, Mass.,

MANUFACTURER OF

TACKS, BRADS, &c.

We make a full line of goods of first
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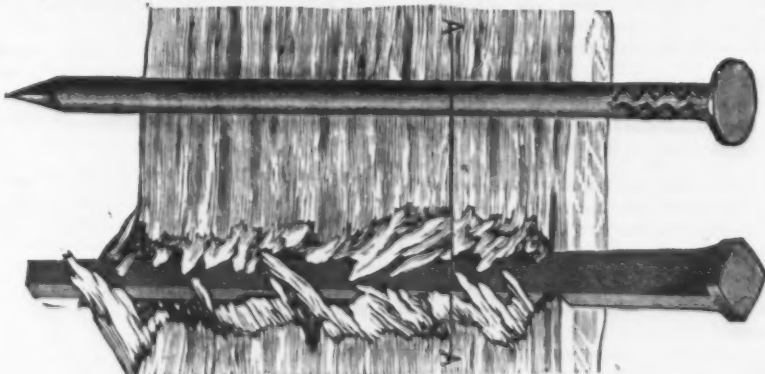


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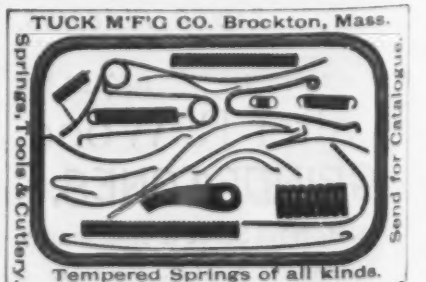
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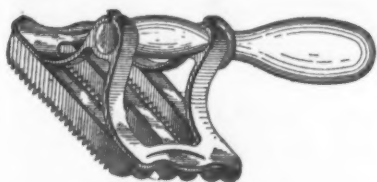
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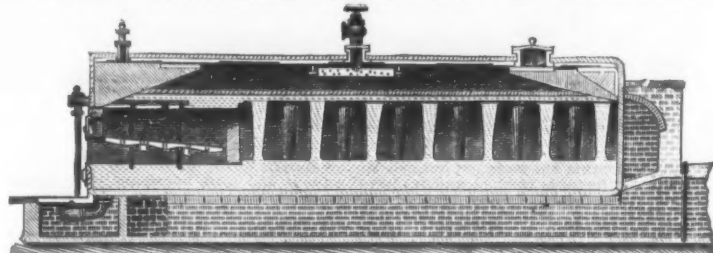


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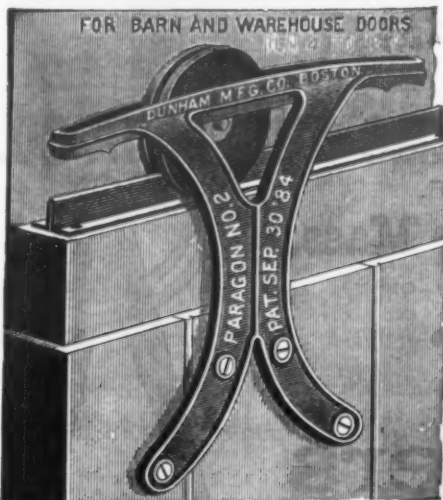
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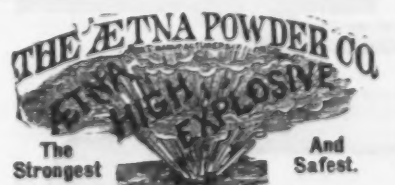
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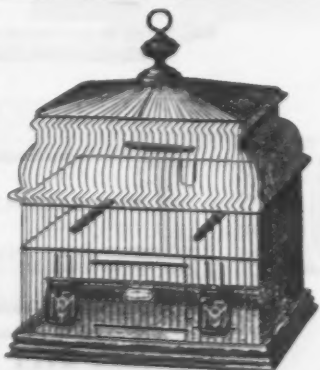
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touching the questions at issue. The District Attorney, it is understood, is further investigating the subject, and arrests have been made.

The United States mails to Mexico and the West Indies are now having quicker dispatch, the Ward and Alexander steamship managers volunteering to forward them at the old rate, namely, 5 cents per letter.

About a dozen Bohemian glass-blowers, on their way to Pittsburgh, arrived at Castle Garden, where Walking Delegate Denny, of the Knights of Labor, charged that they were under an unlawful contract to labor. Commissioner Stephenson decided to the contrary and they were not detained.

President Diaz, of Mexico, in his annual message, says, with reference to silver, that Mexico must await the progress of events, and, touching upon the subject of the Tehuantepec Railroad, upon which work is suspended in consequence of the forfeiture of the concession to the late Edward Larned, he says arrangements have been made which give promise of ultimate success.

The Montreal shops of the Canadian Pacific Railway last week turned out the first Consolidation locomotive engine built in the Dominion. Four in all are to be built, each weighing 51½ tons, with a 19-inch cylinder and 22 inches stroke; diameter of driving-wheel, 51 inches.

The master plumbers of Pittsburgh and Allegheny contemplate the formation of a stock company for the manufacture of gas fixtures on a rental basis, as landlords refuse to put in the fittings called for since the discovery of natural gas.

Local improvements in New York City are in progress on a considerable scale on public account. The Commissioners of the Sinking Fund have authorized the issue of \$500,000 for the construction of the Gansevoort market building, also \$2,000,000 for the Dock Commissioners. Plans for the Eighth Regiment Armory by Geo. B. Post have been approved which contemplate an expenditure of \$350,000, and those for the Twenty-second Regiment, by J. R. Thomas, architect, involve a sum not to exceed \$291,000. In addition to these improvements the work of the Subway Commission and the Aqueduct Commission will give employment to a large force of laborers for many months to come.

The steamer Catekill, laden with passengers from up the Hudson, had a large hole stove in her planking by a Pennsylvania ferry-boat, and was saved from sinking by checking the ingress of water with bedding and mattresses. Canvas weighted at one edge always in readiness would be a good substitute for such a primitive device.

The master cutlers of Sheffield, England, had a gala day on the occasion of the installation of the master cutler elect, Geo. Francis Lockwood. In accordance with the ancient ceremonial of the Cutlers' Company there was a procession from Cutlers' Hall to the Town Hall, where the oaths were administered, and thence to the parish church, and in the evening 400 guests were hospitably entertained, the Lord Chief Justice of England and the Judge Advocate General joining in the oratory which closed the entertainment.

The freight contract recently signed by the Baltimore and Ohio Railroad Company and the arrangements making for freight transfer in New York harbor have an important bearing upon the future trade of this port. Among other details growing out of the contracts with the Jersey Central, floats are being constructed for the delivery and transfer of loaded cars to all points in the harbor, as well as to and from Eastern roads running into New York, and barges and boats for the handling and storing of grain and other freight over the Jersey Central while the two years' freight-traffic contract between the Baltimore and Ohio shall continue and until they can complete their own road to Staten Island. Meanwhile they will build an enormous grain elevator and freight warehouses at the terminus of the Baltimore and Ohio at that point.

A general resumption of work in the Western window-glass manufactories will take place October 1, the demand for an advance in wages having been withdrawn.

The German Colonial Congress lately in session at Berlin appointed a permanent committee to encourage German emigration to South Brazil and South Australia, but an African trade and colonization scheme, coupled with proposed subventions for the maintenance of steamship lines to Africa, is not favored by the general public.

The Governors or their representatives of the original 13 States were welcomed on Friday by Governor Pattison, of Pennsylvania, in the State House in Philadelphia, where the Declaration of Independence was signed 110 years ago, the object of the gathering being to prepare for the centennial anniversary of the adoption of the Federal Constitution. In behalf of the Governors, Gen. Fitz Hugh Lee, of Virginia, gave assurances respecting the future stability and progress of the country. He said: "I thank God that the question of State sovereignty has been settled and is now behind instead of before us. I can say of the Southern States that their future

efforts will all be directed toward the building up of this great country. We are part and parcel of a boundless nation, and we will do our parts toward making the country what our forefathers intended it should be—the glory of America and a blessing to the world." This centenary will occur September 17, 1887.

The labor question was ably treated by Senator Edmunds in an address delivered at the Vermont State Fair. In the course of a long speech he said: "American legislation and the efforts of American lawmakers—who are really the people—ought to be directed to the utmost development of every variety of American production, and so to the improvement of the condition of the American laborer and the American employer of labor of every kind, by giving that labor full employment and adequate reward and to the employed ready and steady market. The constantly employed and well paid laborer will become himself a man of accumulating capital—the force of labor transposed into things. He will become a landholder; his wife and children—of the first of whom he ought to have one, and of the second many—will abide in his own house. He will see that the liberty of the laboring man is not only the liberty to 'strike,' as the phrase is, but that it is the equal liberty not to strike if he does not wish to, and the liberty to work in peace and safety if he thinks it for his interest so to do, while others may choose, as they have a perfect right to do, not to work upon the terms proposed. He will learn that violence against the administration of law, or unlawful coercion of any kind exerted toward other workmen or toward employers, are crimes of the gravest character against all labor and the welfare of laboring men, upon whom the consequences of such things always finally fall more heavily than on any other class of society.

The great Liverpool shipping brokers in their latest circular give a sober account of the condition of British shipbuilding interests. Builders and engineers, we are told, are very short of work, and the competition to secure the few good orders lately given out has been unusually severe, and prices more than ever rule favorably for the ship owner. A large number of second-hand steamers have recently been sold, but at very low prices, and many builders have new vessels left on their hands which they are anxious to dispose of. This surplus of steamers is in the face of the fact that new tonnage has fallen off greatly in comparison with previous years. On the Clyde, for example, during the last six months the shipping launched has been only 84,622 tons, while for the same time in 1883 it was 198,729 tons, in 1884 142,986 tons and last year 93,925 tons.

An adjourned conference of European diplomats will meet in Tokio in October for the revision of the Japanese commercial treaties. Although its deliberations are of little importance, they seem to have attracted little general attention, and none whatever through the Atlantic cable; but it is intimated by a Tokio correspondent of the London Times that there is more disposition, at least on the part of England and Germany, to treat Japan with the consideration she deserves, apparently in the expectation that more liberal views will meet with corresponding concessions advantageous to trade. Concerning the tariff there is said to be a substantial agreement, and final action is hoped for before the end of the present year.

Minister Denby, at Peking, reports to the State Department at Washington a number of recent outrages upon American missionaries in China, prompted by a spirit of retaliation growing out of troubles in the United States. In one instance property to the value of \$5000 was destroyed. Mr. Denby filed a protest.

An official French report shows for the last eight months an increase in the value of exports from France of £3,400,000, and a decrease in the value of imports of £1,440,000, as compared with the same period in 1885.

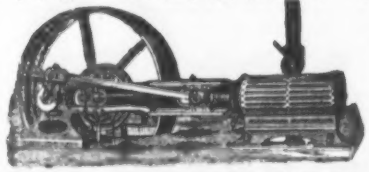
The Austrian Government, heeding the protests of scientific men against low-lying sites for meteorological observatories, has just completed a structure at Salzburg, in the Austrian Alps, at an elevation of 10,000 feet. It will be telegraphically connected with the central office by wires crossing a glacier. The mountain has been chosen owing to its being a famous center of electrical disturbance, and the workmen who have been engaged in building the observatory are said to have had numerous opportunities of watching the way in which lightning behaves as seen from above the clouds. For greater security the building has a copper roof.

A fleet of torpedo-boats was repulsed in a sham night attack upon the United States frigate Tennessee in Newport harbor. The ship had been carefully fenced in by floating booms made from the light yards and masts, which sufficed to turn aside the blows intended for her destruction. Sharpshooters, together with gatling guns, fired blank cartridges, and small defensive torpedoes attached to the ends of the booms were exploded. The wild discharge of hot water from the hose was the main factor in the work of decimating the foe.

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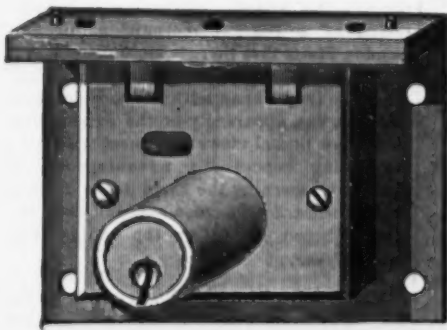
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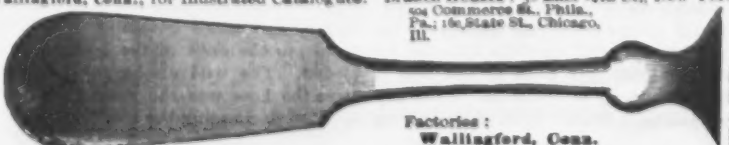
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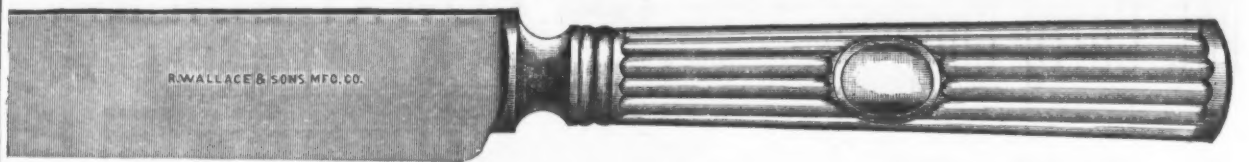
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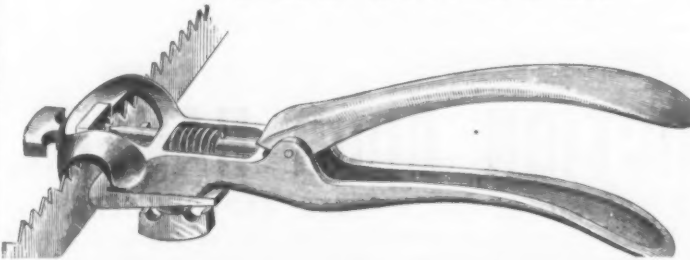


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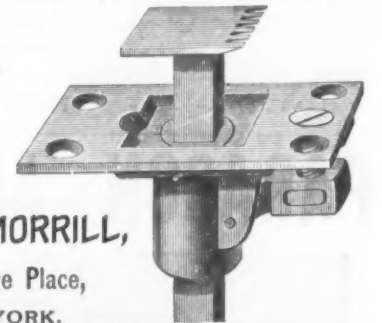
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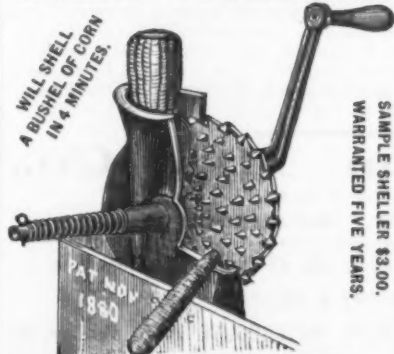


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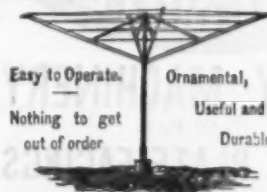
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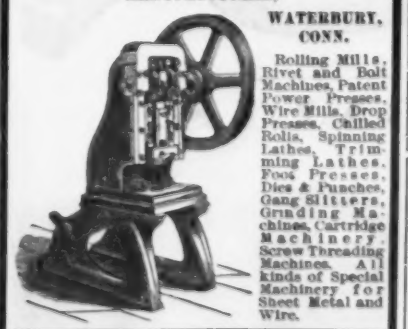


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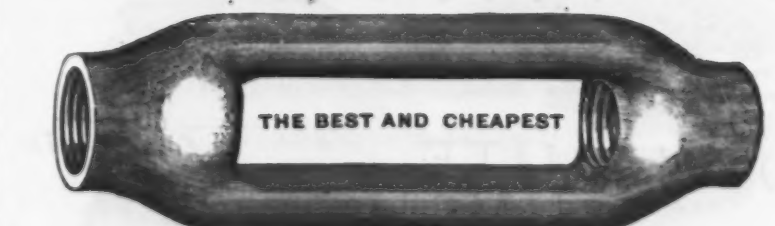
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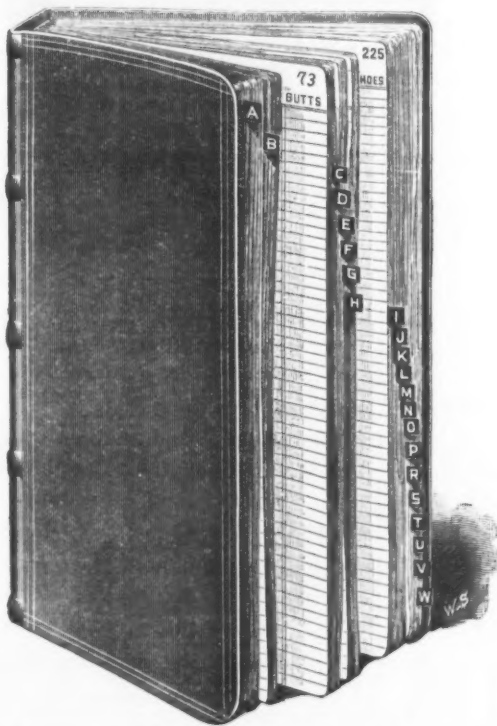
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The *Discount Table* is arranged so that reference is very quickly made. Computations are made on each figure from 10 cents to \$5.00. From \$5.00 to \$15.00 the advance is by 5 cents, thus: \$5.05, \$5.10, &c., except in cases where printed lists contain odd figures which are inserted. From \$15.00 to \$50.00 only such amounts are extended as are required by the lists.

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THESE cards cover the lines having a large variety of sizes or numbers, avoid marking each package or article in Retail Stores, and are very convenient for use in Wholesale Sample Rooms. They secure correct and uniform selling prices, pay for themselves several times a year by saving time, and are intended for at least ten years' constant use. Hence no Hardware Dealer can afford to do without them or spend the time required to write and rule out something similar by hand. They are printed in very distinct type on the best paper appropriately ruled with blue ink cross lines and red ink down rulings, for noting in pencil List, Cost, Jobbing and Selling Prices, as in sample of Card 11-A, shown in the last column of this page. Cards A and B of each number are mounted on EACH SIDE of a tough, heavy cardboard, especially adapted for this use, which is further protected on the four edges by being CLOTH-BOUND.

Two-thirds of them are 3 x 13½ inches. This size has been found convenient for hanging on a pilaster finish, or any other narrow surface, without hiding the goods. To hang or chain up each card there is firmly inserted through the top and center a nickel-plated eyelet about ¼ inch inside diameter. They will be sent, CHARGES PREPAID, on receipt of price.

DESCRIPTION AND PRICES.

Card No.	Description	Size and Price per Card.
1	A—Bar Iron, Weight of Round, Square and Flat, per foot and Tire per set. Western Classification and Prices of Extras on American, Norway and Sweden.	5½x18 in. 40 Cts.
2	B—Bar Steel, All Kinds and Sizes, with Prices of Extras. Horse and Mule Shoes, Size, Weight, No. in Keg. Toe Calks, Cut Nails, List of Extras.	3x13½ in. 30 Cts.
3	A—Cut Tacks, exact size cuts. Length. Number in a pound.	3x13½ in. 30 Cts.
4	B—Large Head Carpet Tacks. Gimp and Lace Tacks. Hungarian Nails, Hob Nails, Blued and Tinned, American and Swedes. Exact size cuts shown of all the above.	6x16 in. 40 Cts.
5	A—Shoe Nails, Clear Box Nails, Copper Tacks, Double Pointed Tacks and Cuts, Glaziers' Points and Cuts, Barbed Blind Staples.	3x13½ in. 30 Cts.
6	B—Patent Brads, Finishing Nails, Blued Clout Nails, Tinned Clout Nails.	3x13½ in. 30 Cts.
7	A—Iron Wood Screws (continued). Iron Machine Screws.	6x16 in. 40 Cts.
8	B—Standard Carriage Bolts (continued). Plow Bolts.	3x13½ in. 30 Cts.
9	A—Machine Bolts.	3x13½ in. 30 Cts.
10	B—Standard Tire Bolts. Round and Flat Head Stove Bolts.	3x13½ in. 30 Cts.
11	A—Philadelphia Carriage and Tire Bolts.	3x13½ in. 30 Cts.
12	B—Square and Hexagon Nuts, Wrought Washers, Size of Bolt. Size of Hole, Width, Thickness, number in a lb.	3x13½ in. 30 Cts.
13	A—Coach or Lag Screws, Superior and Norway Axle Clips.	3x13½ in. 30 Cts.
14	B—Bright Screw Hooks, Bolt Hooks, Blake's Belt Studs.	3x13½ in. 30 Cts.
15	A—Bright Screw Eyes, Gate Hooks and Eyes, Cornice Hooks and Eyes.	3x13½ in. 30 Cts.
16	B—Plate Casters and Bed Casters.	3x13½ in. 30 Cts.
17	A—Wrought Hooks and Staples, Trap Door Rings, Hinges and Staples, and Staples only.	3x13½ in. 30 Cts.
18	B—Saws, Hand, Panel and Rip, Combination and Back, Disston's and W. M. & C's, corresponding numbers and "Our Brand."	3x13½ in. 30 Cts.
19	A—Saws, Back, Compass, Pruning, Kitchen, Butchers' Bow and Blades, Framed Wood Saws and Blades.	3x13½ in. 30 Cts.
20	B—Chisels, Slicks, Socket Framing, Socket and Tang d Firmer, Corner.	3x13½ in. 30 Cts.
21	A—Turning Chisels and Gouges, Socket and Tanged Firmer Gouges.	3x13½ in. 30 Cts.
22	B—Cast Steel Augers and Bits, Boring Machine Augers.	3x13½ in. 30 Cts.
23	A—Bit Stock Drills, Gimlet Bits, German Pattern, Double Cut and Countersink. Center Bits, Clark's Expansive Bits.	3x13½ in. 30 Cts.
24	B—Hammers, Adze Eye, Bell Face, Joiners', Steel Face and Claw, Riveting, Farriers', Blacksmiths', Machinists, Engineers.	3x13½ in. 30 Cts.
25	A—Hammers, Tack, Masons', Sledges, Miscellaneous, Hatchets, Shingling, Lath, Half, Claw, broad or Bench, Hunters'.	3x13½ in. 30 Cts.
26	B—Files, Bastard, Mill, Flat, Hand, Half-round, Round, Square, Knave, Second Cut, Mill, Flat, Hand Half-round, Smooth, Flat and Hand.	7x15 in. 50 Cts.
27	A—Files, Smooth Half-round, Round, Cabinet, Pit Saw, Hook Tooth, Gin Saw, Band Saw, Cant, Taper, stubb's Taper, Rasps, Cabinet, Wood, Shoe, Horse.	3x13½ in. 30 Cts.
28	B—Rubber and Hemp Packing, Gaskets or Rings, Rubber Hose.	3x13½ in. 30 Cts.
29	A—Leather and Rubber Helting.	3x13½ in. 30 Cts.
30	B—Window Glass—List Prices and No. Lights per box. Also ruled columns for other Wholesale and Retail rates.	6x18 in. 40 Cts.
31	A—Sash Doors and Blinds, List Prices.	3x13½ in. 30 Cts.
32	B—Hinges, Strap, Light and heavy, T, Light, Heavy and Extra Heavy, Hinge Hasps, Screw Hook and Strap.	3x13½ in. 30 Cts.
33	A—Screw Hook and Eye Hinges, Barn Door Hangers, Checked Back, Kildee, Anti-Friction, Wrought Frame, Barn Door Stay Rollers, Rail, Pulis, Latches, Sliding Door Rails.	3x13½ in. 30 Cts.
34	B—Wrought Butts, Narrow, Loose Pin, Light Inside Blind.	3x13½ in. 30 Cts.
35	A—Loose Pin Butts, Plain, Japanned and Plated Tips.	3x13½ in. 30 Cts.
36	B—Table Hinges, Bronzed Iron Blind Butts, Brass Butts, Narrow, Middle, Broad and Desk. Width when open given of all.	3x13½ in. 30 Cts.
37	A—Door Bolts, Barrel, Square Spring, Foot, Chain.	3x13½ in. 30 Cts.
38	B—Door Bolts, Flush, Neck and Miscellaneous kinds.	3x13½ in. 30 Cts.
39	A—Screw Drivers, Flat and Round Blade, Ratchet, Clark's Screw Driver Bits, Countersinks, Reamers, Belt or Saddlers' Punches.	3x13½ in. 30 Cts.
40	B—Wrenches.	3x13½ in. 30 Cts.
41	A—Hooks, Coat and Hat, Wardrobe, Schoolhouse, Harness Clothes-line.	3x13½ in. 30 Cts.
42	B—Shelf Brackets, Drawer Pulls.	3x13½ in. 30 Cts.
43	A—Wood Planes, Plane Irons, Cut and Double.	3x13½ in. 30 Cts.
44	B—Patent Planes, Patent Plane Irons.	7x22 in. 60 Cts.
45	A—Woodenware and Baskets, Alphabetically arranged.	7x22 in. 60 Cts.
46	B—Woodenware (continued). Alphabetically arranged.	7x22 in. 60 Cts.
47	A—Pierced Tinware, Alphabetically arranged.	7x22 in. 60 Cts.
48	B—Stamped Tinware, Alphabetically arranged.	7x22 in. 60 Cts.
49	A—Japanned Tinware, Alphabetically arranged.	7x22 in. 60 Cts.
50	B—Granite or Agate Ironware, Planished Ware, Stove and Hollow Ware, All Alphabetically arranged.	7x22 in. 60 Cts.
51	A—Mortise Door Locks, Latches, Knobs and Escutcheons.	7x22 in. 60 Cts.
52	B—Rim Door Locks, Latches, &c.	6½x22 in. 60 Cts.
53	A—Padlocks, Japanned, Wrought Iron, Bronzed Iron, Brass and Jail.	7x24 in. 60 Cts.
54	B—Complete Comparative List of Corresponding Numbers of Padlocks, Mailory-Wheeler Co., Wm. Gilroy Mfg. Co., Russell & Erwin Mfg. Co., Norwich Lock Mfg. Co., Nimick & Brittan Mfg. Co. Revised to July, 1885.	7x24 in. 60 Cts.
55	A—Cabinet Locks, Drawer, Chest, Cupboard and Trunk.	7x24 in. 60 Cts.
56	B—Complete Comparative List of Corresponding Numbers of Cabinet Locks, Eagle, Corbin, Parker, Gaylord. Revised to July, 1885.	7x24 in. 60 Cts.
57	A—Length and number of Nails to the pound. Number of feet in a bundle of Hoop, Scroll and Band Iron. Number of feet of Wire in a pound. Coil or Cable Chain, weight per 100 feet and proof in tons. Bright Coil and Hatter Chain and corresponding No. of Wire. Sash weights and line required for common sized windows.	6x22 in. 60 Cts.
58	B—Miscellaneous Tables, Showing number Copper Rivets and Butts in a pound. Size of Skates compared with Shoes. Scale Beams, pole or weight needed for each. Brass Kettles, size, weight and capacity. Strap and T Hinges, weight and number packed in a barrel. Comparative Nos. of leading makers of Rules and Levels. Revised to July, 1885. Manila Rope, feet in a pound, weight of coils, breaking strain, &c.	4x14 in. 30 Cts.
59	A—Is adapted for filling in with any line of goods. It is ruled both sides, with columns headed respectively "Description," "Size or No.," "List," "Cost," "Job," "Sell."	4x7 in. 10 Cts.
60	B—As No. 32, but half size, for smaller lines of goods.	5½x9½ in. 30 Cts.
61	A—Wire Nails, Exact Size Cuts.	5½x9½ in. 30 Cts.
62	B—Wire Nails, List prices and number in a pound.	5½x9½ in. 30 Cts.
63	A—Gas Pipe, Black and Galvanized. List prices, Weight per foot and number threads per inch of screw. Also Malleable Pipe Fittings illustrated.	5½x9½ in. 30 Cts.
64	B—Is ruled similar to No. 32, and is adapted for any line of goods.	5½x9½ in. 30 Cts.
65	A—Tin Plates and Metals, Sizes of Tin, Number Sheets in Box, Weight and Gauge. Block Tin, Lead, Snider, Antimony, Slat and Sheet Zinc.	5½x9½ in. 30 Cts.
66	B—Sheet Iron and Copper, Iron, Common, Smooth, Galvanized, American and Genuine Russia. Copper, Sheathing, Planished and Copper Bottoms and soldering coppers.	5½x9½ in. 30 Cts.
67	A—Malleable Iron, Illustrated. Whiffletree Ferrules, Tongues, Hooks, Couplings and Plates. T and Shaft Irons, Shaft, Body, Ferch and Neck-yoke Loops.	5½x18 in. 40 Cts.
68	B—Malleable Iron, Illustrated. Pole and Neck-yoke Type, End or Tail Board Plates, Washers and Suts, Stake Rings and Irons, Wagon Box Spring Irons, Check and Footman Loops, Corner Irons, Spring and Axle Blocks.	5½x18 in. 40 Cts.
69	A—Malleable Iron, Illustrated. Axle Yokes, Wear Irons, Wrenches, Carriage Rim Bands, Oar or Row Locks.	5½x18 in. 40 Cts.
70	B—Malleable Iron, Illustrated. Step Plates, Carriage, Wagon and Cutter Steps, Thumb Nuts, Sand Bands.	5½x9½ in. 30 Cts.
71	A—Handles, Illustrated. Auger, Cross-Cut Saw, Axe, Broad Axe, Adze, Hatchet, Hammer, Pick, Sledge.	5½x9½ in. 30 Cts.
72	B—Is ruled similar to No. 32, and is adapted for any line of goods.	5½x9½ in. 30 Cts.
73	A—Wire Cloth and Netting, Illustrated, Plain, Painted and Galvanized.	5½x9½ in. 30 Cts.
74	B—Is ruled similar to No. 32, and is adapted for any line of goods.	5½x9½ in. 30 Cts.

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(CARD NO. 11-A.)

SAWS.

DISSTON'S NO. 3. PANEL, HAND & RIP. W. M. & C. NO. 12.				
Length In.	List.	Cost.	Job.	Sell.
16				
18				
20				
22				
26				
28				

DISSTON'S NO. 7. PANEL, HAND & RIP. W. M. & C. NO. 25.				
Length In.	List.	Cost.	Job.	Sell.
16				
18				
20				
22				
26				
28				
30				

DISSTON'S NO. 8. HAND AND RIP. W. M. & C. NO. 26.				
Length In.	List.	Cost.	Job.	Sell.
26				
28				

DISSTON'S NO. D. 8. HAND AND RIP. W. M. & C. NO. 27.				
Length In.	List.	Cost.	Job.	Sell.
26				
28				
30				

DISSTON'S NO. 12. HAND AND RIP.				
Length In.	List.	Cost.	Job.	Sell.
26				
28				

OUR BRAND.

PANEL, HAND AND RIP.				
Length In.	List.	Cost.	Job.	Sell.
16				
18				
20				
22				
26				
28				

SPECIAL C. S. PANEL AND HAND.

Length In.	List.	Cost.	Job.	Sell.
16				
18				
20				
26				

COMBINATION HAND.

Length In.	List.	Cost.	Job.	Sell.
26				

DISSTON'S NO. 1. BACK. W. M. & C. NO. 5.				
Length In.	List.	Cost.	Job.	Sell.
10				
12				
14				
16				

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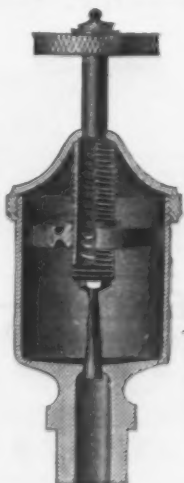
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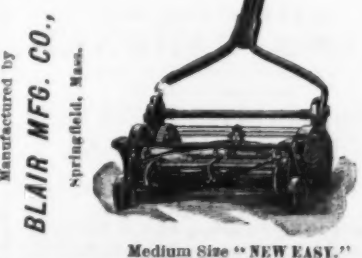


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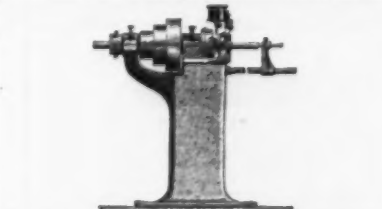
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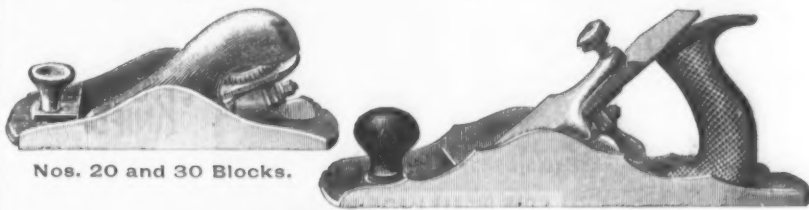
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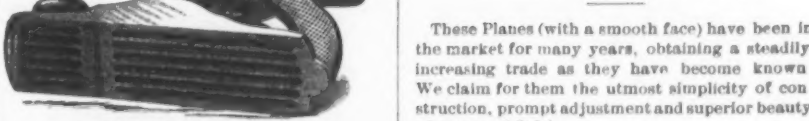


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CORRUGATED FACE.	SMOOTH FACE.	
No. 204, Iron Smooth Plane, 7x1 1/2 in. Cutter,	No. 204, Iron Smooth Plane, 7x1 1/2 in. Cutter,	\$1.00
No. 205, Iron Smooth Plane, 8x1 1/2 in. Cutter,	No. 205, Iron Smooth Plane, 8x1 1/2 in. Cutter,	1.25
No. 206, Iron Smooth Plane, 9x1 1/2 in. Cutter,	No. 206, Iron Smooth Plane, 9x1 1/2 in. Cutter,	1.50
No. 207, Iron Smooth Plane, 10x1 1/2 in. Cutter,	No. 207, Iron Smooth Plane, 10x1 1/2 in. Cutter,	1.75
No. 208, Iron Smooth Plane, 11x1 1/2 in. Cutter,	No. 208, Iron Smooth Plane, 11x1 1/2 in. Cutter,	2.00
No. 209, Iron Smooth Plane, 12x1 1/2 in. Cutter,	No. 209, Iron Smooth Plane, 12x1 1/2 in. Cutter,	2.25
No. 210, Iron Smooth Plane, 13x1 1/2 in. Cutter,	No. 210, Iron Smooth Plane, 13x1 1/2 in. Cutter,	2.50
No. 211, Iron Smooth Plane, 14x1 1/2 in. Cutter,	No. 211, Iron Smooth Plane, 14x1 1/2 in. Cutter,	2.75
No. 212, Iron Smooth Plane, 15x1 1/2 in. Cutter,	No. 212, Iron Smooth Plane, 15x1 1/2 in. Cutter,	3.00
No. 213, Iron Smooth Plane, 16x1 1/2 in. Cutter,	No. 213, Iron Smooth Plane, 16x1 1/2 in. Cutter,	3.25
No. 214, Iron Smooth Plane, 17x1 1/2 in. Cutter,	No. 214, Iron Smooth Plane, 17x1 1/2 in. Cutter,	3.50
No. 215, Iron Smooth Plane, 18x1 1/2 in. Cutter,	No. 215, Iron Smooth Plane, 18x1 1/2 in. Cutter,	3.75
No. 216, Iron Smooth Plane, 19x1 1/2 in. Cutter,	No. 216, Iron Smooth Plane, 19x1 1/2 in. Cutter,	4.00
No. 217, Iron Smooth Plane, 20x1 1/2 in. Cutter,	No. 217, Iron Smooth Plane, 20x1 1/2 in. Cutter,	4.25
No. 218, Iron Smooth Plane, 21x1 1/2 in. Cutter,	No. 218, Iron Smooth Plane, 21x1 1/2 in. Cutter,	4.50
No. 219, Iron Smooth Plane, 22x1 1/2 in. Cutter,	No. 219, Iron Smooth Plane, 22x1 1/2 in. Cutter,	4.75
No. 220, Iron Smooth Plane, 23x1 1/2 in. Cutter,	No. 220, Iron Smooth Plane, 23x1 1/2 in. Cutter,	5.00
No. 221, Iron Smooth Plane, 24x1 1/2 in. Cutter,	No. 221, Iron Smooth Plane, 24x1 1/2 in. Cutter,	5.25
No. 222, Iron Smooth Plane, 25x1 1/2 in. Cutter,	No. 222, Iron Smooth Plane, 25x1 1/2 in. Cutter,	5.50
No. 223, Iron Smooth Plane, 26x1 1/2 in. Cutter,	No. 223, Iron Smooth Plane, 26x1 1/2 in. Cutter,	5.75
No. 224, Iron Smooth Plane, 27x1 1/2 in. Cutter,	No. 224, Iron Smooth Plane, 27x1 1/2 in. Cutter,	6.00
No. 225, Iron Smooth Plane, 28x1 1/2 in. Cutter,	No. 225, Iron Smooth Plane, 28x1 1/2 in. Cutter,	6.25
No. 226, Iron Smooth Plane, 29x1 1/2 in. Cutter,	No. 226, Iron Smooth Plane, 29x1 1/2 in. Cutter,	6.50
No. 227, Iron Smooth Plane, 30x1 1/2 in. Cutter,	No. 227, Iron Smooth Plane, 30x1 1/2 in. Cutter,	6.75

With Adjustable Throat.

No. 228, Iron Smooth Plane, 8x1 1/2 in. Cutter,

No. 229, Iron Smooth Plane, 8x1 1/2 in. Cutter,

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No. 231, Block Plane, Nickel-Plated, 6 1/2 x 1 1/2 in. Cutter,

Both with Adjustable Throat.

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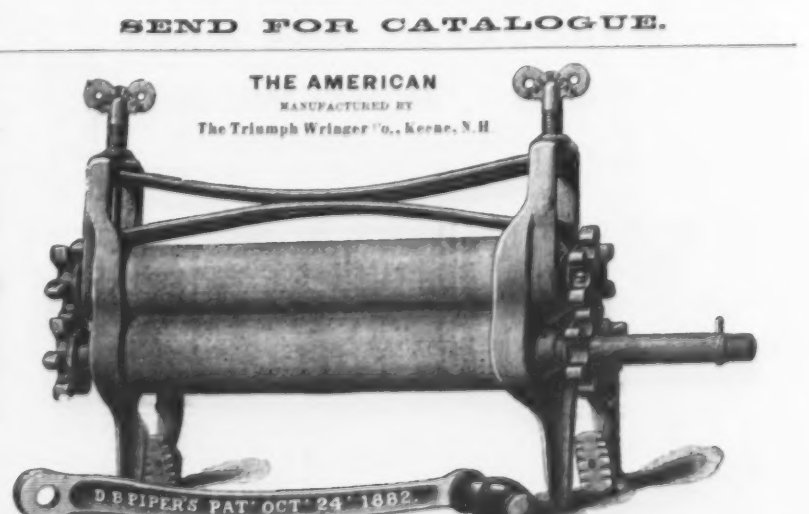


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Galvanized, Nos. 7 to 18, Market List, 10¢ doz. net.

Wringers.
Peerless No. 2, 10¢ doz. net.
Peerless No. 3, 10¢ doz. net.
Universal No. 2, 10¢ doz. net.
Universal No. 3, 10¢ doz. net.
Universal No. 4, 10¢ doz. net.
Universal No. 5, 10¢ doz. net.
Universal No. 6, 10¢ doz. net.
Universal No. 7, 10¢ doz. net.
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Universal No. 19, 10¢ doz. net.
Universal No. 20, 10¢ doz. net.
Universal No. 21, 10¢ doz. net.
Universal No. 22, 10¢ doz. net.
Universal No. 23, 10¢ doz. net.
Universal No. 24, 10¢ doz. net.
Universal No. 25, 10¢ doz. net.
Universal No. 26, 10¢ doz. net.

For fluctuations and discounts on card rates see weekly Pittsburgh Trade Report.
The following are card rates.

Flat Bar.
1 1/2 to 4 by 1/2 to 1, 10¢ doz. net.
4 to 6 by 1/2 to 1, 10¢ doz. net.
6 to 8 by 1/2 to 1, 10¢ doz. net.
8 to 10 by 1/2 to 1, 10¢ doz. net.

Rounds and Squares.
1 to 1 1/2, 10¢ doz. net.
1 1/2 to 2, 10¢ doz. net.
2 to 3, 10¢ doz. net.
3 to 4, 10¢ doz. net.

Half Oval and Half Round.
1 1/2 to 4 by 1/2 to 1, 10¢ doz. net.
4 to 6 by 1/2 to 1, 10¢ doz. net.
6 to 8 by 1/2 to 1, 10¢ doz. net.
8 to 10 by 1/2 to 1, 10¢ doz. net.

Wagon Box Iron.
1 1/2 to 4 by 1/2 to 1, 10¢ doz. net.
4 to 6 by 1/2 to 1, 10¢ doz. net.
6 to 8 by 1/2 to 1, 10¢ doz. net.
8 to 10 by 1/2 to 1, 10¢ doz. net.

Heavy Bands.
1 1/2 to 4 by 1/2 to 1, 10¢ doz. net.
4 to 6 by 1/2 to 1, 10¢ doz. net.
6 to 8 by 1/2 to 1, 10¢ doz. net.
8 to 10 by 1/2 to 1, 10¢ doz. net.

Light Bands.
1 1/2 to 4 by 1/2 to 1, 10¢ doz. net.
4 to 6 by 1/2 to 1, 10¢ doz. net.
6 to 8 by 1/2 to 1, 10¢ doz. net.
8 to 10 by 1/2 to 1, 10¢ doz. net.

Hoops.
1 1/2 to 4 by 1/2 to 1, 10¢ doz. net.
4 to 6 by 1/2 to 1, 10¢ doz. net.
6 to 8 by 1/2 to 1, 10¢ doz. net.
8 to 10 by 1/2 to 1, 10¢ doz. net.

Barrel Hoops.
1 1/2 to 4 by 1/2 to 1, 10¢ doz. net.
4 to 6 by 1/2 to 1, 10¢ doz. net.
6 to 8 by 1/2 to 1, 10¢ doz. net.
8 to 10 by 1/2 to 1, 10¢ doz. net.

Sheet Iron.
No. 10 to 14, 10¢ doz. net.
No. 15 to 17, 10¢ doz. net.
No. 18 to 20, 10¢ doz. net.
No. 21 to 23, 10¢ doz. net.

Sheet Iron.
No. 10 to 14, 10¢ doz. net.
No. 15 to 17, 10¢ doz. net.
No. 18 to 20, 10¢ doz. net.
No. 21 to 23, 10¢ doz. net.

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List of Extras.
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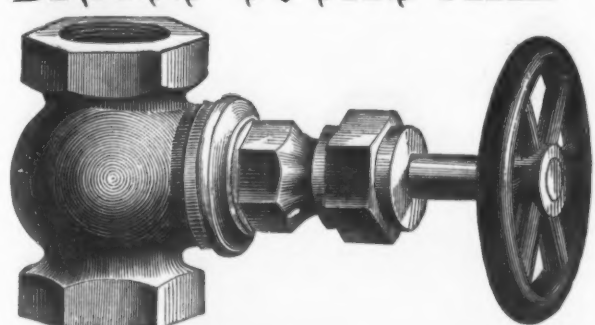
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McNab & Harlin Mfg. Co., MANUFACTURERS OF BRASS COCKS AND VALVES



For Steam,
Water,
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WROUGHT IRON
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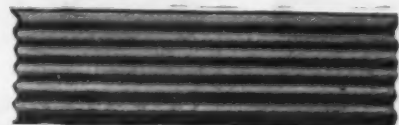
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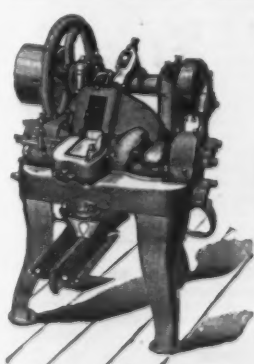
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Straight
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IMPROVED CUT NAIL MACHINES

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Prices and particulars furnished on application.

TENSILE STRAIN: \$56,000 to 64,000 lbs.
REDUCTION OF AREA—35 to 43 per cent.



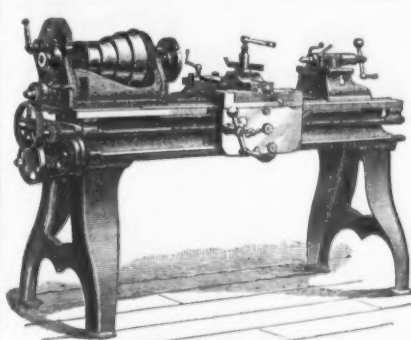
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Locomotive, Fire Box, Flange and Shell
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Plates 1 1/4 inch thick to No. 14.
CAPACITY, 30 feet long.
70 inches wide.



10-in. S ing Engine Lathe.

This Lathe is made with a hollow steel spindle, steel lead screw, steel rack, patent friction rod feed, rests are made either raise and fall or plain gibbed, and lathe with or without taper attachment. Send for Special Description and Price List.

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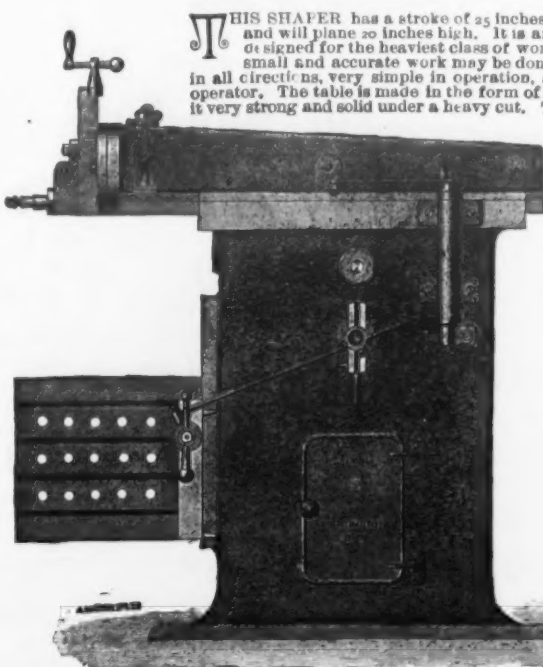
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Railway and Machinists'
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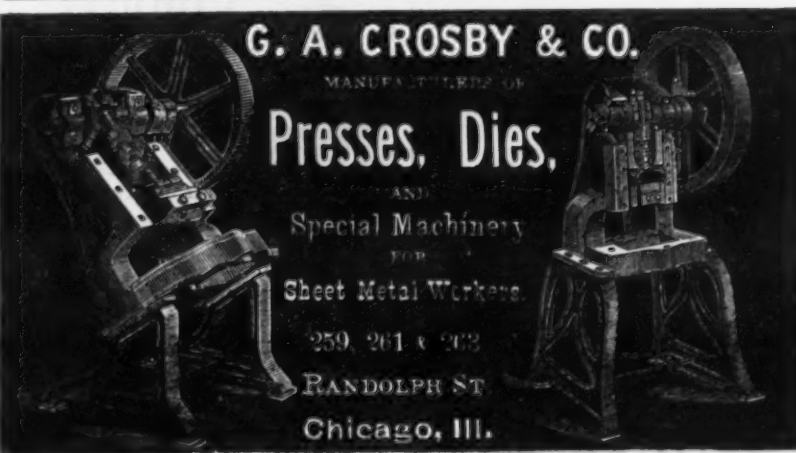
NEW 25-INCH SHAPER.



THIS SHAPER has a stroke of 25 inches, cross-feed of table 27 inches, and will plane 20 inches high. It is an extra heavy machine, and is designed for the heaviest class of work, while at the same time very small and accurate work may be done on it. It has automatic feed in all directions, very simple in operation, and within easy reach of the operator. The table is made in the form of a four-sided box, which makes it very strong and solid under a heavy cut. Table will move to the left far enough to take in 8 1/2 inches to center of machine, and tool can be set at an angle to plane 10 or 11 inches wide. A bar of 4-inch iron may be passed through under the cutter bar for key seating or other work. The cutter bar is driven by two rack gears of large diameter, on a heavy steel shaft supported on bearings at each end. Driving pinion and gear are on the outside of the machine, allowing the use of extra large gear and increased speed of pulleys, and consequent gain of power on cutter bar. All pinions made of best machine steel. Driving and feed shafts have extra outside bearings or supports. The machine has patent improved friction driving movement, and we guarantee cutter bar to work up to a line and reverse without jar or noise.

Weight of Machine, 2700 pounds.
Size of Tight and Loose Pulleys on C. Shaft, 12 x 3.
Speed of Counter Shaft, 250 revolutions.

THE HENDEY MACHINE CO., TORRINGTON, CONN.



G. A. CROSBY & CO.

MANUFACTURERS OF

Presses, Dies,

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Special Machinery

FOR
Sheet Metal Workers.

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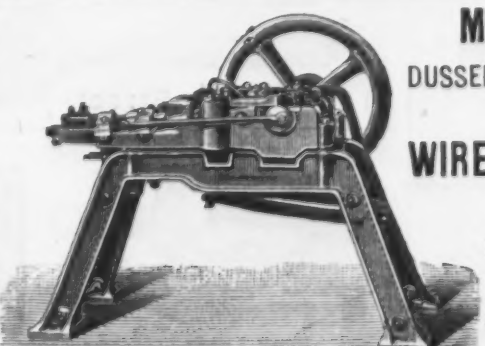
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W.H. CARTER'S PATENT NEEDLE HAY KNIFE.

PAT. APR. 29, 1884.
IMPROVED BY M.M. BARTLETT.
Improvement Patented April 28, 1885.

SOLE MANUFACTURERS OF
Carter's Improved NEEDLE HAY KNIFE, THE BEST IN THE WORLD.

Improvement patented April 28, 1885, of which we are the sole manufacturers, has been tested with the most celebrated knives of other makers, and has proved an easier and faster cutter than any other. Its special excellence consists in the chisel-edge tooth shown in the engraving. It may be used for cutting hay in the mow, stack and bale; also for ditching, cutting peat, or any other work for which a hay knife is used. It can be readily ground by the most inexperienced, as it requires to be ground only on one side. Should a tooth break, all that is necessary to replace the damage is to grind it once and a new chisel-tooth appears. It can ordinarily be sharpened with a common scythe stone. Try one and you will give it the preference.



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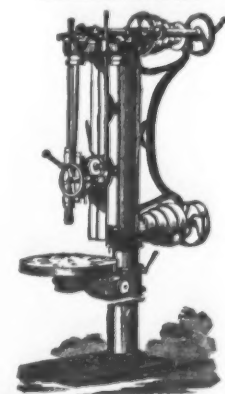
PATENTED MAY 19, 1885

A great improvement over the old style. Prevents slipping from head of the nail. Made of best quality Tool Steel. Carefully tempered. Appreciated and bought at sight by all mechanics. Prices on application. Made only by

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P. BLAISDELL & CO., Worcester, Mass.,

Manufacturers of the



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15,000 lb. use.

Many have done hard, continuous duty years without a single part being renewed. This is the key of our success. They have built up a reputation themselves that cannot be approached. Our improved Radial Drills are also assuming the same standard.

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Nock's Improved PAD LOCKS.



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THE DANGLER FURNACE.

The only Vapor Furnace that has proven an absolute success for bench and outdoor use. The Dangler Combination Furnace can now be seen and bought in all the leading cities and towns throughout the United States. For further information address

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THE REIHER IMPROVED Self-Locking TRANSCOM LIFTER

answers equally well for Transoms.

Hinged at the top.
Hinged at the bottom.
Hinged at the center.

F. A. REIHER,
Manufacturer.

11 and 13 Canal St., Chicago

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Send for catalogue.

Cut showing the parts belong-
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A. The locking bar.

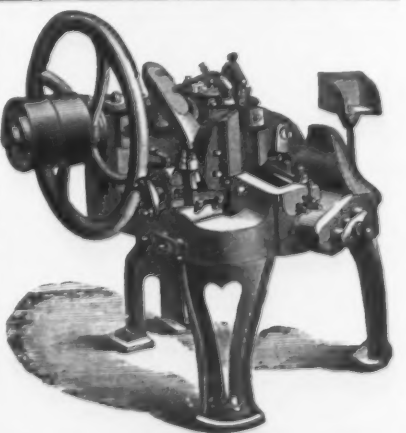
B. The self-locking adjusta-
block.

C. The operating rod.

D. The lower bracket.

E. The lifting arm.

F. The transverse bracket.



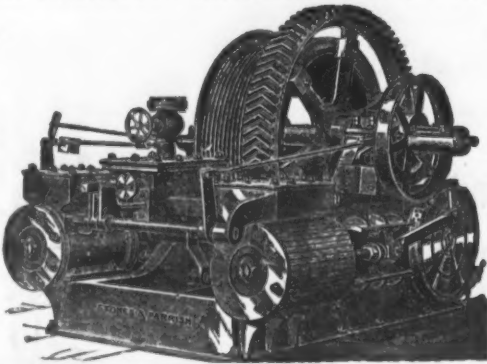
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For Mines, Dock
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BLAST FURNACE HOISTING ENGINES,

With Vertical or Horizontal Cylinders for Handling Stock to Top of Stack
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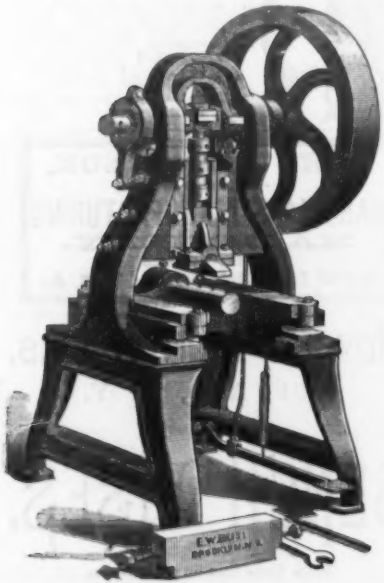
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MANUFACTURERS OF

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For Working all Shapes and Classes
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DOUBLE
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HAND AND POWER
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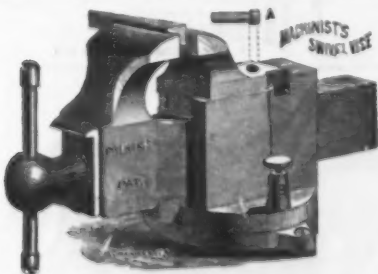
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PRENTISS' PATENT VISES,

ADJUSTABLE JAW,

Stationary or Pat. Swivel Bottoms,

Adapted to all Kinds of Vise Work, also

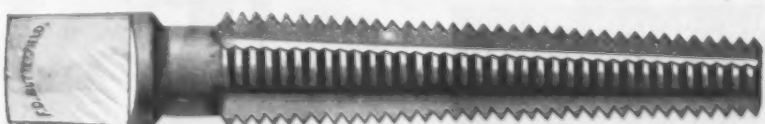
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FITS ANY VISE. SOLD BY THE TRADE.

PRENTISS VISE CO.,

23 Day St., New York, SOLE PROPRIETORS. SEND FOR CIRCULAR.

BUTTERFIELD & CO., MANUFACTURERS, DERBY LINE, VT.



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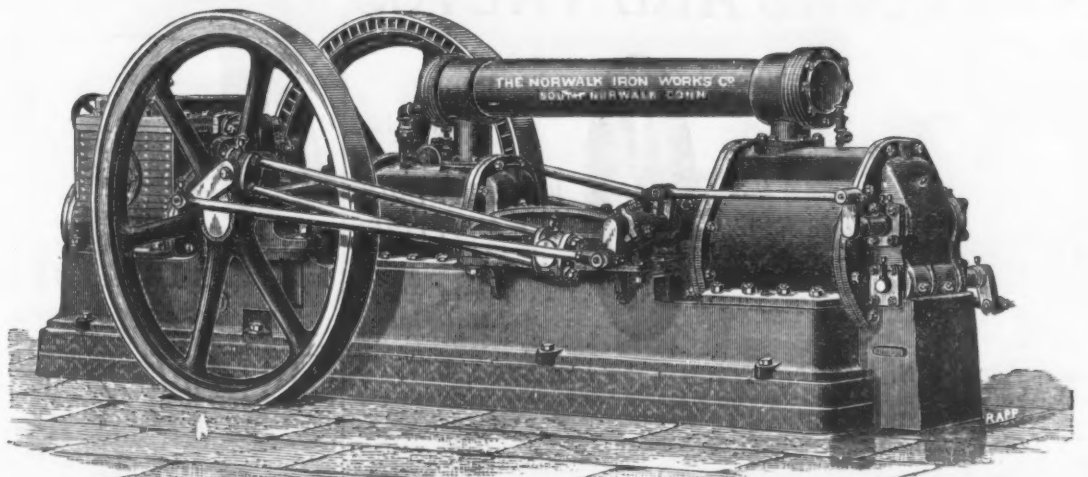
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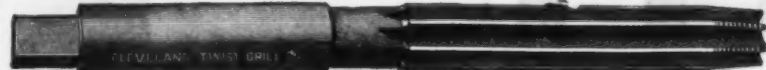
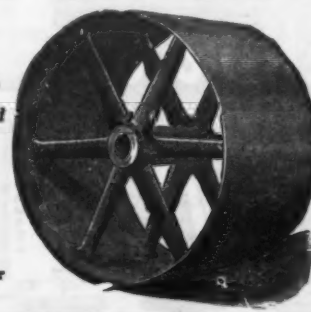
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A SPECIALTY.

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Double and Single Gate, 1/4 in. to 48 in.—outside and inside Screws, Indicator, &c.
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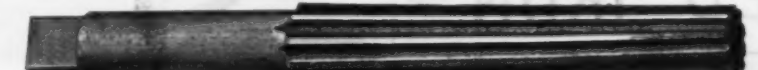
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Bit Stock Drills, Solid and Shell Reamers, Drill Grinding Machines,

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Beach's Patent Self-Centering Chucks, and Special Tools to Order.



ALL TOOLS EXACT TO WHITWORTH STANDARD GAUGES.

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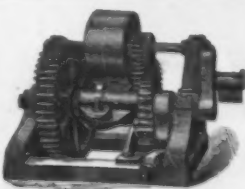
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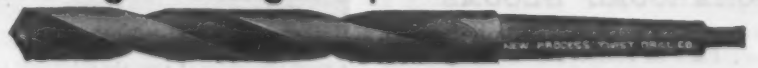
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Pipe Reamers: also of Solid Bolt and Pipe Dies.
Furnished in V, U, S. Standard and Whitworth
shape of threads.



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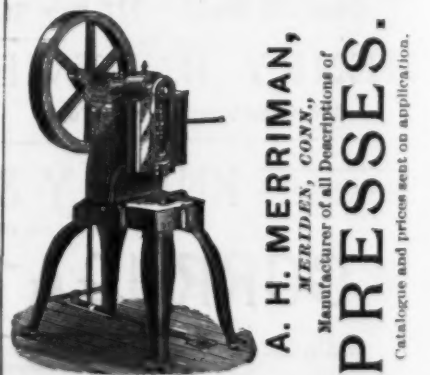
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Outfits for actual workshop business.
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20-in., 24-in., 28-in. and 32-in.

Upright Drills.

20-in. and 32-in. Back Geared and

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Write for Illustrated Catalogue and Prices. IT WILL PAY YOU.

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-FOR-

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The BEST Steam Valve Ever Produced.

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As the plug comes in contact only with VULCANIZED ASBESTOS, it never cuts, grinds or sticks, as is the case with ordinary cocks.

This Cock always opens and closes easily and remains absolutely TIGHT where all other Valves or Cocks will leak.

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Producing a continuous flow of water, both in suction and discharge. Works smoother and easier than any other force pump in the market. Has Seamless Drawn Brass Cylinders and no stuffing boxes. Never freezes in winter, and is not liable to get out of order. With Hose Attachment it is valuable as a fire protection, and for sprinkling lawns, gardens, &c. It is specially adapted for all kinds of wells—dug, drilled or driven—and for pumping water long distances from springs.

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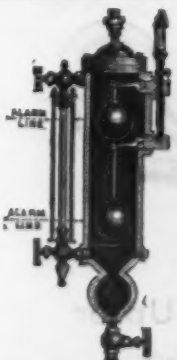
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With the Ratchet Stock pipe can be threaded in a corner, down in wells, or in positions that would be inaccessible with other tools. Send for Circulars and Price Lists to

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SIMPLE IN CON-

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PER CENT. LESS GAS THAN PER HORSE-POWER.

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Store and Housekeeper's

Favorite, and

SELLS AT SIGHT.

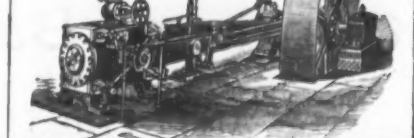
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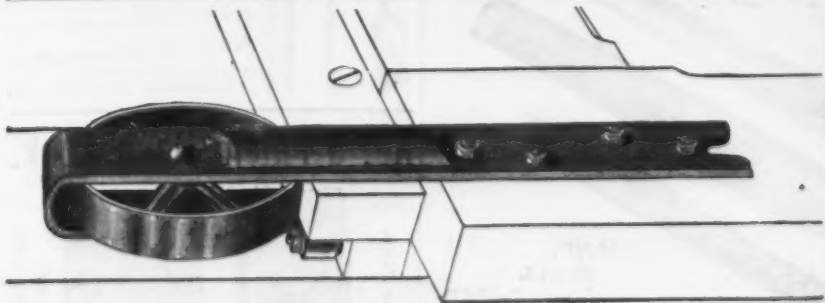
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SMOOTH INSIDE AND OUT
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The success of our machine is the best guarantee of its value.
Only machine with Double Helve. Does more and better
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Punching Presses.
DIES AND OTHER TOOLS
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SHELEY, CHURCH & CO., San Francisco, Cal., Sole Agents for Pacific Coast.**Stearns' Patent Wrought-Iron Barn Door Hanger**

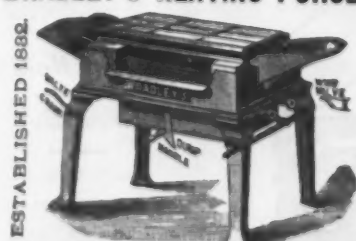
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Has more good points, does more and better work and costs less for repairs than
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The Circular Shape of this Tool enables it to work in a smaller circle than any other Spoke Shave. The edge of the knife is such that it cuts instead of scraping the grain of the wood. Either handle can be removed to work in a ramped place. The Iron Stock of this tool is face-plated; the handles are rosewood; the curved blade of the best forged steel, making altogether a very beautiful and useful tool.

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**LIGHTNING AND GREEN RIVER
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BOLT CUTTERS, HAND AND POWER,
DRILLING MACHINES, PUNCHING PRESSES,
TIRE BENDERS, TIRE UPSETTERS
And Other Labor Saving Tools.
Send for Price List.

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Bicycles and Tricycles.
Highest Grade of Machines
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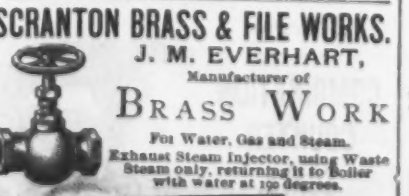
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AIR COMPRESSORS
For CATALOGUES, ESTIMATES, Etc., Address,
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Carriage Bolts made from Best Square Iron a Specialty.

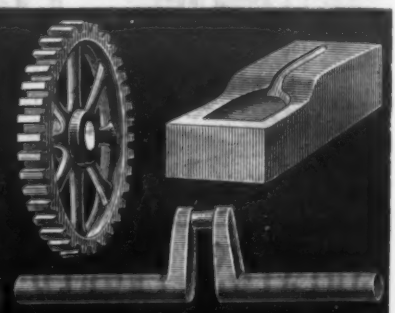
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WAGON, CART AND
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CASTINGS,**

**FROM CRUCIBLE and OPEN HEARTH.**

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AIR-FURNACE REFINED MALLEABLE CASTINGS.

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Having had twelve years' experience in the making of STEEL CASTINGS, we are able to refer to our customers in all parts of the United States and Canada as to the quality of our work in this line.

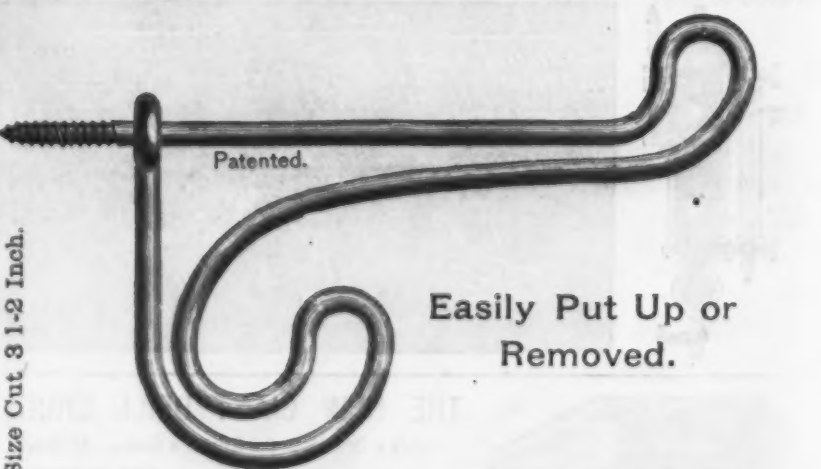
We make castings of steel practically free from blowholes, as soft and easily worked as wrought iron, yet stiff, strong and durable, with a tensile strength of not less than 65,000 pounds to the square inch. In short, our castings unite the qualities of steel and wrought iron.

Wheels, Pinions, Cranks, Dies, Hammer Heads, Engines and Machinery Castings of all descriptions, Railroad Frogs and Crossings, Plowshares, Moldboards and Landslides.

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EMPIRE,
Ball and Toy Braces,**
Plain and Nickel Plated.Manufacturers of **BIT BRACES and HARDWARE SPECIALTIES.**

Catalogues and Price Lists furnished on application.

GEM WIRE COAT AND HAT HOOKS.

Patented.

Easily Put Up or
Removed.

Full Size Cut 3 1-2 Inch.

Size	Walnut.		Bronzed		Coppered.		Tinned.		Brass.	
	No.	Per gross.	No.	Per gross.	No.	Per gross.	No.	Per gross.	No.	Per gross.
2 inch.....	50	\$1.90	150	\$1.75	250	\$2.20	750	\$4.75		
2½ inch.....	60	2.15	160	2.00	260	2.65	760	5.20		
3 inch.....	70	2.55	170	2.40	270	3.40	770	6.60		
3½ inch.....	80	3.20	180	3.00	280	4.60	780	8.75		

Neat Sample Cards will be furnished to Hardware Dealers on application.

VAN WAGONER & WILLIAMS CO.,

- MANUFACTURERS, -

82 Beekman Street, - - New York.